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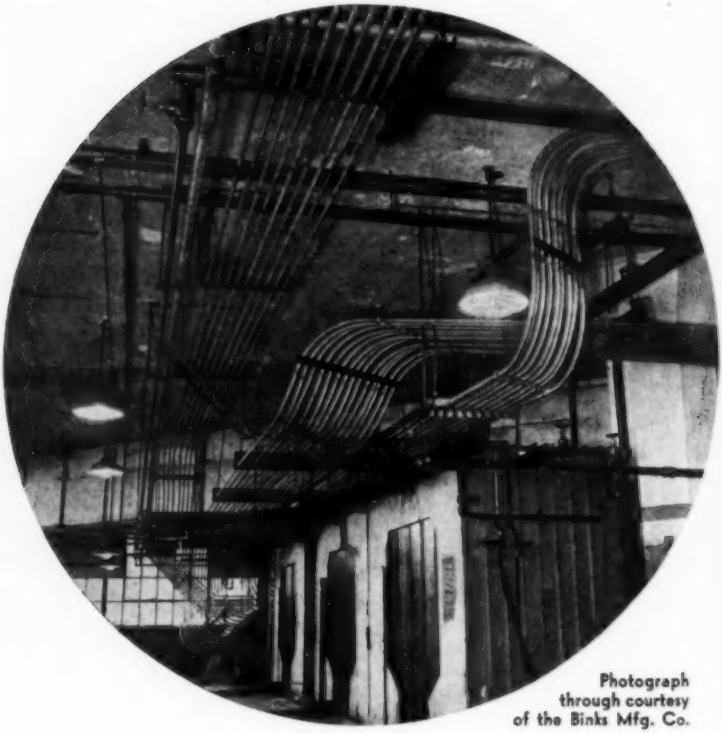


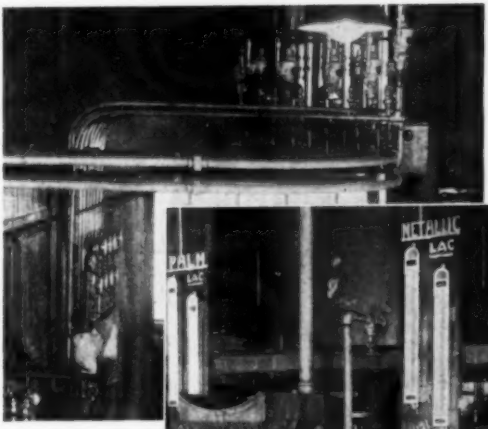
Photograph through courtesy of the Binks Mfg. Co.

Paint Circulating Systems

Prepared by Engineers of the Industrial Dept. of Binks Mfg. Co.

DURING the past year, many paint-circulating systems have been installed throughout the country. The fact that these installations were made at this time is perhaps due, at least in part, to the generally increased production schedules, a natural demand for greater efficiency, and a desire for better control of painting operations; but the fact that they are circulating systems rather than other types of paint handling systems is the result of the solution of many problems by paint engineers.

Basically a circulating system consists of a tank, a pump to draw paint from the tank, and a



At top: View of fluid pressure regulators mounted on pipe lines entering spray booth.

At bottom: Close-up of one of the 200-gallon mixing tanks from which paint of exactly the correct color and consistency is supplied to the pipe lines. Photographs from Binks Mfg. Co.

pipe line from the pump to the spray booth and back to the tank. However, to make a system practical and flexible, other equipment is essential.

To start with, when any fluid is pumped through a pipe, the pressure in that pipe is different at every point. Therefore, it becomes a prime necessity to provide a fluid pressure regulator on the line at each point where paint is to be used in order to equalize the pressure at each outlet, or to provide the proper reduction from main line pressure. The modern fluid pressure regulator is so sensitive that there is almost no perceptible change in the regulated pressure when the spray gun is opened.

Pressure is regulated by a removable key, and a by-pass feature is provided for use when blowing back the paint hose. Since these two features are separate and distinct, the first being performed by the foreman and the second by the workman, they are kept separate on the regulator. The pressure regulating key is removable so that the paint foreman, once he has set the material pressure at the desired point, can be sure that his men are not varying fluid pressure and in this way spoiling a uniform finish, which can be obtained only through the use of a uniform pressure.

The whole matter of paint agi-

Rows of tanks in paint-mixing room. Photograph, courtesy of Binks Mfg. Co.

tation has received the most careful study. The tanks are generally made with dished bottoms and have fixed baffles welded to the inside in addition to the revolving paddles. Because of increased flexibility and economy, the majority of circulating tank agitators are now driven by individual geared-head explosion-proof electric motors.

The question of velocity of paint through the circulating lines is of great importance. When the paint is pumped at the proper speed through the lines, it is positive insurance against the possibility of precipitation of the solids in the lines, which would result in off-color work. If a velocity greater than necessary is maintained, however, an unnecessary pressure is put on the system, which means higher operating cost. Different types of paint may run at different velocities.

The proper linear flow, paint viscosity, and length of the lines —all are factors to consider in determining the proper pipe line size and pump capacity.

Cleaning the Pipe Lines

In a properly designed and operated system, it is practically never necessary to clean the lines except when a change is being made to a different paint or at the end of a production period when the system is being shut down.

For cleaning a circulating system, special connections are arranged to facilitate pumping of thinner through the lines and blowing out with air.

In order that all paint going out on the line shall be perfectly clean, a filter is placed on the discharge side of the pump. This filter can be cleaned while the system is in operation and without being removed from the line. Different types of paint require filters of different sizes and construction.

The return line is provided with a throttle valve so that the pressure on the line can be raised if necessary. The pressure which should be maintained on any circulating line will be based upon the fluid pressure required at the gun and the nearness of the last outlet or fluid pressure regulator to the return end of the line.

The Central Mixing Tanks

In the majority of cases, two tanks are provided for each line, and these are piped so that material can be pumped to the line from either tank and returned to either tank. This makes it possible to mix a new batch of paint in one tank while another batch is being circulated from the second tank. No loss of time occurs.

It is also common practice to install hydrostatic gauges on these tanks and, as a result, paint can be easily mixed by weight instead of by volume, and paint viscosity can be accurately controlled.

The size of tanks depends upon the production requirements of the particular installation. One recent 20-line installation uses two 200-gallon tanks per line, and another recent installation uses 30-gallon tanks.

Paint Stays Clean and Uniform in Color and Viscosity

The modern circulating system has done more than anything else to promote standardization and centralized control in present-day production painting. The paint is mixed in large quantities in a special paint room, where color and viscosity can be accurately controlled and dirt can be kept out.

The same paint is circulated through all spray booths in a completely closed system, which means that the paint is kept clean and that the identical material is delivered to all operators. With the modern material regulator with removable pressure adjustment key, the fluid pressure at all guns can be kept the same. No more can an operator vary the fluid pressure to meet his individual fancy, or change paint viscosity by the addition of thinner to the particular pressure tank which he may be using.

This centralized control has been a prime factor in the reduction of rejects due to dirty or off-color paint and in the realization of greater paint economy due to the accurate control of fluid pressure.

Among other advantages and savings which result from the use of paint circulating systems are:

1) The elimination of trucking and handling of paint to and from booths.

2) The elimination of labor, paint loss, and the cost of thinners for cleaning paint containers.

3) The elimination of possible costly production delays due to change of color.

4) The reduction of floor space requirements to a minimum.

5) The reduction of fire hazard.

6) Better working conditions.

Excellent for Smaller Plants, too

While a majority of paint-circulating systems have been installed in plants where production is heavy, many of the advantages and savings would apply, in proportion to the smaller plants. For example, in the installation using 30-gallon tanks, which was referred to above, the total daily consumption of paint for five colors was estimated at about ten gallons. However, a 5-line installation has shown itself very

profitable, principally because rejects caused by dirty paint, off-color paint, or uneven coating have been practically eliminated.

The management of a manufacturing plant equipped with a paint circulating and control system can set its finishing standards and know that, at least within reasonable limitations, such standards will be maintained.

Furniture Finishing in Small Factory

IN REVIEWING the progress made in the wood-finishing industry over a period of several years, we must admit that it has kept strides with many other kinds of modern industrial activities. It has had the benefit of scientific planning, modern equipment and several improvements in the many materials used.

Notwithstanding the favorable comparison of the present with the past, we still have many problems in the average furniture factory today. The struggle for production is ever with us. Then, due to the uncertainty of business conditions and the tendency of manufacturers and jobbers to carry low stocks, we have had a general stepping up in production speed to meet shipping dates. This has brought about the elimination of many unskilled and one-job men. The all-around man who can be transferred from one department to another finds himself more valuable than ever.

Here is a schedule of finishing for a medium-priced line of walnut finish on willow wood which, of course, contains no pores. We will take a job of 50 cases:

1) Application of pigmented walnut uniforming stain, either by brush or spray; rag off; dry over night.

2) Apply coat of sanding sealer; dry two hours.

3) Sand with No. 4/0 sandpaper.

4) Place in spray booth any white edges or sap, and "smoke" very thin with lacquer shader tinted to blend in; then immediately apply semi-gloss synthetic varnish; dry over night to rub and ship.

These varnishes seem to body-up under rubbing. For rubbing we use an apparently new product, known as "water-oil." It doesn't require any oiling off or silexing, and the semi-gloss synthetic varnish, which usually carries a stearate or some other substance incorporated to bring down the sheen, does not have the tendency to soften back under water-oil at it does with paraffin or other so-called rubbing oils. This is practically a 2-day finish—a great improvement in speed over the varnish of a few years back. In the average factory we fix a temporary bench, here and there, and let John step in to work beside Henry. So a shipping date is met and a product that we are not ashamed of is on its way.—JAMES W. MCFADDEN.

Hercules' New York Offices Are Moved

The New York offices of the Hercules Powder Co. have been moved to 22 E. 40th St., at Madison Ave. The company invites anyone interested to inspect the new quarters and to view displays of Hercules' products which are now serving so many different industries. Walter M. Annette is the manager. Telephone, Caledonia 5-8580.

HOW TO MAKE AND
HOW TO USE

Silk Screen Stencils

by Harry L. Hill
An Experienced, Skillful Operator

IN SILK-SCREEN process decorating and printing the three major pieces of equipment include a wood frame to hold the stretched silk screen, a squeegee tool, and a base or work table over which to place the framed silk screen stencil and the work for stenciling. Guides on the base provide a convenient means of correctly positioning the cards or panels to be stencil painted.

Look at Fig. 1. Here you see the frame, screen side up, with the silk partly tacked on one flat side, close to two of the four inside edges, like screen wire on a window screen. The frame must be straight and flat, therefore, I suggest making it of straight-grained soft white pine or something equally suitable. The material is surfaced four sides to net 1½x3-in. Dimensions of the opening in the frame should be at least 4-in. wider and 8-in. longer than the panels or cards to be stenciled.

Several kinds of fabrics are available for silk screen work, among them being bolting silk and organdy. I find bolting silk more economical in the long run. It stands up better under severe wear and can be drawn much tighter than other fabrics while tacking it to the frame, thus insuring perfect registration in multi-color printing. The meshes of bolting cloth for process work range from No. 8 (coarse) to No. 20 (fine). For printing fine detail work the finer mesh is required.

To properly stretch the silk, start tacking at one corner and continue along one of the long sides of the frame, keeping about ½-in. back from the inner edge. Pull the fabric tightly as each tack is driven. Be sure that tacks are not more than ½-in. apart. Next, tack one of the short sides of the frame, starting where the tacking on the long side ended. Now you have it tacked down in an L

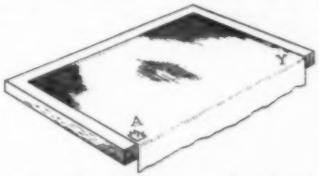


Fig. 1—A silk screen stencil frame of wood, with the silk screen in position for tacking. The silk has been tacked along one long edge and one short edge, from Z around to Y. Then it was pulled tight and tacked temporarily at A. Next it is to be tacked from Y. to A, the workman pulling it tightly as he goes along. Finally it will be tacked from A to Z, after which the surplus silk will be carefully trimmed off.

shape, as shown in Fig. 1. Pull the silk tightly and tack it down temporarily at corner *A*, driving two or three tacks through a piece of thin carboard or cloth to act as a pad to prevent the fabric from tearing. Now resume tacking at *Y*, and continue along the remaining long side to *A*. Pull tightly against each tack on the opposite side. When this long side is completely tacked, remove the temporary tacks at corner *A* and begin tacking the remaining short side *AZ*, pulling against each opposite tack as you go along.

By stretching and tacking the silk in this careful manner, you get a square open mesh in the completed screen. After the tacking has been completed, trim off the surplus silk and apply two coats of shellac to the entire wood frame. Give the first coat plenty of time to dry before putting on the second coat. These coatings of shellac help to cement the silk to the frame, thereby preventing any possibility of it tearing loose at the tacks. Shellac seals the silk to the frame just like liquid glue.

Now can you visualize placing a strip of 1-in. angle iron along the inside edge of the frame, so that one side bears against the silk while the other side bears against the inner edge of the frame, as shown at *C* in Fig. 2? Well, instead of iron, substitute a strip of thin muslin 2-in. wide, 1-in. to lay against the wood and 1-in. to lay against the silk. To make this strip of muslin stick firmly in place all around, coat the frame and silk surfaces with shellac and, when this coating becomes tacky, press the clean muslin strips carefully into place. Then shellac the outside of the muslin generously. Now, when the shellaced muslin strip becomes thoroughly dry and hard, you have a well reinforced screen, sealed in such a manner that no paint or cleaning fluid can work in between the fabric and the wood frame. This construction prevents wastage of paint and makes the cleaning of the frame and silk more easy.

Making the Stencil

Now let's make this framed open-mesh silk into a suitable stencil for reproducing exact duplicates of decorative designs or printing. There are different ways of making stencils. An ordinary way of making a knife-cut stencil is as follows: Coat a thin sheet of tracing paper with two applications of shellac — regular 5-lb. cut shellac. Apply the shellac evenly, but not too heavily. Allow each coat ample time to dry. The coated paper must be

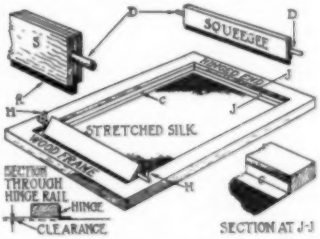


Fig. 2—The completed silk screen ready for a cut-out shellaced paper stencil to be applied with a hot iron. Note enlarged detail of the muslin reinforcement strip marked C; also details of how one end of the wood frame is hinged to the work table, and how the squeegee blade is made. Before the free end of the frame is lifted to admit or release a panel to be stenciled, the squeegee tool is placed at rest at the end opposite the hinges, so its dowel pins DD, rest against upright pins HH.

transparent. Place the original drawing or sketch to be copied, on a drawing board. Cover it with a thin sheet of clear celluloid, which is to serve as the "cutting block." Next place the shellaced paper, shellac side up, on top of the celluloid. Fasten all three firmly at the four corners with thumb tacks. Now you are ready to cut your stencil out of the shellaced paper, your sharp knife to be guided by the original drawing or sketch which is held in position under the sheet of celluloid. (Both the original drawing and the sheet of celluloid are under your shellaced sheet of paper.) The sheet of celluloid gives a smooth, clean cutting surface and prevents your knife from cutting into and damaging the original sketch. Cut out all of the design to be printed, and be careful to mark all center pieces that drop loose, such as those in the letters A, B, O, etc., so they can be replaced in their correct positions after the cutting has been completed.

Attaching Stencil to Screen

With the stencil all cut, lay it out carefully on a sheet of plate glass; fasten it temporarily to the plate glass (paper side down, shellac side up) with a thin film of cup grease. Don't cover the entire glass with grease, as this isn't necessary. Too much grease will smear and prevent adhesion at the edges of the stencil, when fastening same to the stretched silk screen.

To "cement" the shellaced paper stencil firmly and permanently to the silk screen, you must use a hot iron and ironing cloth. With the plate glass and shellaced stencil lying face up, carefully lay the silk screen frame (as you see it in Fig. 2) over the cut stencil. Arrange to clamp it down temporarily with weights or whatever will work conveniently to prevent the screen from shifting its position while you are cementing the stencil in place with a hot iron. Have ready a warm iron and a piece of heavy muslin doubled. Now take a wad or ball of knit goods and moisten it thoroughly with alcohol, but don't make it dripping wet. Moisten the silk where it bears against the shellaced stencil. Treat only a small area at a time and immediately cover it with the doubled thickness of muslin; then apply the hot iron. The iron should be just hot enough so you can touch it without burning your fingers. Apply the iron with firm pressure. If you have saturated the moistening cloth too much with alcohol, the shellac would spread when ironing and cause rough edges around the clean-cut stencil.

After the shellaced paper stencil has been cemented to the silk screen, use lacquer to fill all open spaces that are not to be printed through. Any colored brushing lacquer will do. Coat as evenly as possible *on inside of screen only*. When lacquer is thoroughly dry, hold up screen to light and touch up all openings that are not completely filled. *Never coat on stencil side of screen*, as this would probably interfere with contact when printing. Keep the underside of screen as smooth as possible.

Hinging Screen Frame to Work Table

The completed silk screen stencil is now ready to be fastened to a flat solid base or work table. I

suggest using a 5-ply panel about ¼ to ⅜-in. thick, 3-in. wider and 3-in. longer than the outer dimensions of the silk-screen frame. Naturally, the panel must be perfectly flat and smooth. Hinge the stencil frame to it with a pair of 3-in. loose-pin hinges. Fasten them to one end of the screen frame so that the pin portion of the hinge completely clears the silk side of the stencil frame, as shown in Fig. 2. This gives space between the work table and screen frame so as to allow the stencil to spring away from the painted surface after the squeegee is drawn over it. This immediate "releasing" of the screen stencil from the printed surface eliminates orange peel and puddly effects in the prints.

Putting on Guides

After the screen frame is hinged to the work table, it is necessary to place guides or stops on the work table in order to correctly position the plates or panels to be stenciled. Small triangular plates of celluloid or metal, having rounded corners and being thinner than the panels to be stenciled, are suggested. Each guide should have two or three countersunk holes so it can be fastened in place on the work table with small flat-head screws. The guides and screws must be lower than the top surface of the cards or panels being stenciled. Place these triangular guides so that only their rounded corners touch the edges of the work to be stenciled.

The Squeegee Tool

The scraper or squeegee tool for dragging the process paint across the silk screen stencil, and pressing it through the open mesh of silk, can be readily made of strips of 3-ply panel stock and a strip of new rubber packing of medium flexibility. Notice suggested details of construction in Fig. 2. The rubber blade *R* is about ¼-in. thick and 3-in. wide; one-half of its width is permanently clamped between two panels like *S*. The rubber blade is backed up with a center piece, as shown in the drawing. In each end of the blade holder a hole is bored for a hardwood dowel *D*, which projects out about 1½ to 2-in. and rests against the flat sides of the silk screen frame so the blade handle will not fall flat against the screen or into the batch of process paint at the end of the frame when the frame is lifted for changing the plates or panels being stenciled. To stop the blade from sliding clear off the end of the frame when the latter is lifted to a steep angle, two iron pins are driven into the frame and allowed to project upward as shown at *HH* in Fig. 2.

The last half of this article, to appear next month, discloses information about process paints and explains how to select and use them. The author also tells how to clean the silk screen of all traces of paint after a job has been completed, and how to remove a shellaced paper stencil from the silk screen.

Haynes Laboratories Continues

It is announced that C. W. Haynes Laboratories, Inc. (industrial and chemical research, special formulas and process development) Circuit Ave., West Springfield, Mass., has moved its office to temporary quarters at 44 Hampdon Ave., Springfield, Mass. The former office and laboratory were practically ruined in the flood during March of this year. Since the flood another plant has been placed in regular operation.

CLEANING AND PRIME-COATING THE SURFACES OF

Heavy Machinery

by E. A. Zahn
Works Laboratory, General Electric Co.

THERE ARE many ways in which metal surfaces can be cleaned preparatory to painting, especially the surfaces of large castings and large fabricated parts. The object, of course, is to get the best possible surface for this work. Such parts can be washed with cleaning solvents and sandpapered, but this is not always entirely satisfactory, due to the labor time involved.

After all major surface irregularities have been smoothed out, an excellent method of cleaning is to use what is now generally known as "blast-cleaning" or "abrasive-cleaning," formerly and sometimes still called "sandblasting." Blast-cleaning gives a bright, clean, oil-free surface with the proper "tooth" for priming paints to cling to. Steel shot-blast is being widely used instead of sandblast, and gives a very satisfactory surface for painting, excepting that the surface is almost too rough to expect a coat of priming paint to give full protection. In this case an extra heavy coat of primer* may be necessary. In all cases the priming coat should be applied immediately after the surface has been prepared. If the bare hand of a workman should come in contact with a blast-cleaned surface, that spot may later be the beginning of a paint failure over the entire piece of apparatus. Blast-cleaned surfaces have been known to rust within one or two hours indoors, necessitating a repeat operation.

In many of the smaller establishments the metal-cleaning department is not equipped to do blast-cleaning, and must resort to hand labor on certain parts before painting. All castings should

*Editor's Note: Be careful about using heavy priming coats. Two thin coats are generally preferred, to insure suitable and lasting adhesion to the clean bare metal.

"This is the first of a series of 20 articles, which I believe will be of great interest to many readers of "Industrial Finishing," especially those employed by the larger manufacturing concerns.

"During my employment with the General Electric Co., I have been an admirer of your magazine, and have found it extremely helpful on many occasions."—

E. A. Zahn

be cleaned and prime-coated before leaving the foundry. Suitable paints available for this purpose, can be applied by dipping, spraying or flow-coating, giving full protection during transportation. These paint coatings are seldom damaged during shipment and they withstand considerable abuse from the handling incident to machining operations.

Marking paints and chalk marks, as well as any oil or dirt, should be entirely removed from every piece of apparatus before priming. A chalk mark or spot of oil, or any other kind of dirt which is not entirely removed, may be the cause of an early paint failure.

When hand cleaning any metal surfaces, the workman should use only clean oil-free solvent and clean dry cloths. If the solvent becomes oily or discolored from use, it should be replaced by clean material. To continue cleaning with a dirty solvent simply spreads a destructive film over the entire part. When the solvent has dried on a part that has been washed, it leaves a thin film which must be wiped off with a dry cloth.

Cleaning is equally important after each coat of paint, whenever the part is handled before another coat is applied. In this case the cleaning should be even more thorough, if possible, than on the original bare metal surface. Oil or dirt should be washed off with a solvent not stronger than that used in the paint. If possible a weaker solvent should be used in order to avoid damaging or washing off any of the undercoats. After the solvent has dried, the entire surface should be sanded with fine sandpaper to insure further cleanliness and the removal of any gloss which might cause poor adhesion of this finishing material.

Since practically all paints are somewhat porous and will absorb moisture, additional precautions should be taken to prevent moisture or water coming in contact with the painted surfaces while the work is in progress. All parts that have been prime coated and left outdoors should be placed inside the building for at least 12 hours, at room temperature, before recoating.

The second article in this series, "Preparing the Surfaces of Small Steel Parts," will appear in an early issue.

Lignum-Vitae Bulletins Free

Quoting from a letter sent out by the Lignum-Vitae Products Corp., 100 Boyd Ave., Jersey City, N. J.:

"As the largest importers and fabricators of lignum-vitae, we have for many years planned to assemble and publish all of the available data on the subject in booklet form entitled 'The Industrial Uses of Lignum-Vitae, Champion of the Hardwoods' . . . . and offer free copies to interested key men in industry. As far as we know, this will be the only existing assembly of diversified applications of lignum-vitae in the mechanical arts. It will be attractively illustrated. . . .

"However, to do the job right will take considerable time, and in order to satisfy the demand for such general information—to bridge the gap until the booklet is ready—we have decided to publish periodically a bulletin entitled 'Lignum-Vitae Fact Flashes'. All who show an interest, will receive not only these bulletins, but will eventually be sent a copy of the booklet we plan to publish.

"Lignum-Vitae is a most unusual wood, not only because it is the hardest and heaviest wood in the world, but primarily because it has a natural gum which makes it self-lubricating and thus ideal for mechanical purposes. An added feature is the fact that it is a neutral wood and will resist acids."

Testing Metal Finishes

for adhesion and durability when exposed to severe cold and moisture and bending

by Dr. E. A. Fluevog
Research Chemist
E. I. du Pont de Nemours & Co.

IF A FINISHING system is to be resistant to failure by cold cracking and peeling, it must meet four very important requirements.

1) The finish must have good initial adhesion to the substrate (that is, to the metal or wood surface or to the sealer, surfacer or primer which is applied directly to the metal or wood surface).

2) The finish must be sufficiently impermeable to prevent large quantities of moisture from passing through the film and causing temporary loss of adhesion.

3) The finish must not react with the substrate, otherwise permanent loss of adhesion may result.

4) The finish must remain sufficiently flexible so that its coefficient of expansion at low temperatures is at least equal to that of the substrate over which it is applied.

The need for an accelerated cold cracking test for evaluating finishes became very evident during the first three months of 1934. In studying this problem, it was first necessary to devise a test which, on a laboratory scale, could duplicate the cold cracking failure of finishes which was occurring in the field. Results of these tests made on panels finished with identical systems, but removed from the exposure racks at different times, were not consistent. This indicated that some other factor besides that of low temperature was playing an important part in the cold cracking failure of finishes.

The other factor was apparently the presence of moisture, as panels removed immediately after a rain, or during periods of high humidity, failed more readily when subjected to low temperatures than did panels which were permitted to dry at room temperture before testing. It was, therefore, decided to expose all panels to saturated atmosphere at 150°F. for 15 hours before subjecting them to a low temperature. After a large number of check tests in which the refrigerator temperature was varied from -10°F. to -40°F. (below zero), it was found that the lowest temperature tested gave cold cracking results which were most nearly compar-

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From a paper entitled "Accelerated Cold Cracking Test" prepared and presented by the author at The Midwest Regional Meeting of the Paint & Varnish Division of the American Chemical Society.

able to those obtained in the trade.

In order to be sure that the panels, when cold, were subjected to the various treatments likely to be met in service, tests were made under the following conditions: (1) Cold without flexion; (2) flexion without permanent bending, and (3) permanent bending over a mandrel. In testing specialty finishes for use in particular fields, the actual service conditions will determine which of these treatments should be used in the laboratory test. Thus, the cold cracking test for evaluating finishing systems on which exposure panels are available consist of the following:

1) Subject panels to a saturated atmosphere at 150°F. for 15 hours;

2) Place panels in refrigerator at -40°F. for 15 hours;

3) Remove panels from refrigerator and subject to one or more of the following treatments: (a) Examine without flexion; (b) flexion without permanent bending; (c) permanent bending over a mandrel.

Cold cracking failures always appear at the undercoating metal interface. In studying the relationship of the adhesion of finishes to their resistance to cold cracking, it was found that unless the finishing systems had developed permanent loss of adhesion, the presence of moisture at the film-metal interface was almost always necessary to obtain cold cracking failures. Thus, by increasing the water impermeability of the finish, cold cracking may oftentimes be minimized.

Freshly painted panels may be evaluated as regards resistance to cold cracking by modifying the test used for exposure panels. I suggest this be done as follows:

1) By aging the finished panels for one week at room temperature before testing.

2) By extending the length of exposure in the saturated atmosphere to 72 hours before placing the finished panels in the refrigerator.

3) By requiring that all panels be flexed upon removal from the refrigerator.

4) By repeating the humidity and freezing cycles a second time before considering the test completed. If the finished panels show any signs of cracking or peeling on the completion of this test, the finish should be considered unsatisfactory for use under severe climatic conditions.

Laboratory tests have verified the undesirability of an extremely high build of finish by allowing the old finish to remain. It is imperative that the surface of smooth substrates should be treated in order that the paint may establish an efficient bond. Reactive substrates, such as zinc-coated metals, finished with standard finishes, show early permanent loss of adhesion, due undoubtedly to a reaction between the vehicle in the finish and surface of the substrate.

Finish Coatings Exhibit at Rockefeller Center

Any manufacturer interested in quality industrial coatings is invited to inspect the permanent exhibit of The Stanley Chemical Co. of East Berlin, Conn., at the Metal Products Exhibits, Inc., Rockefeller Center, New York City. In this exhibit, which has been arranged by a prominent New York designer, will be found products of a few of the manufacturers using Stanley coatings. These articles in the metal, wood, rubber, cloth and paper industries reflect some of the wide range of specialized coatings available.

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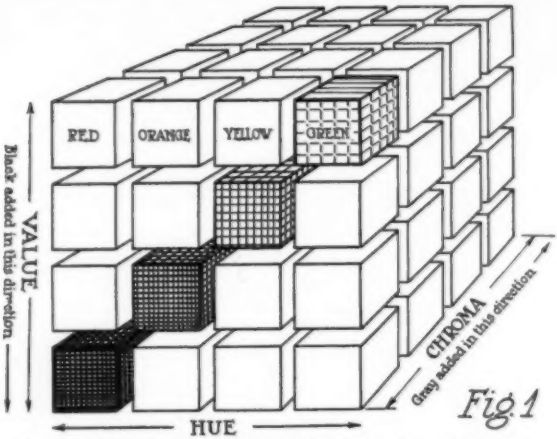


Color, as defined by Albert H. Munsell, has three dimensions.

Color in Product Finishing

by Albert F. Byers
Art Director, Benjamin Franklin Paint & Varnish Co.

COLOR IS a sensatory response to the stimulus of light wave vibrations, and is a property of the eye. If there were no eyes to see, color would be non-existent, except as electromagnetic vibrations.

Thus there are two approaches to the study of color; the objective approach, dealing with the stimuli itself, and the subjective approach, dealing with the mind's response to that stimuli. The first is a science; the second an art.

The manufacturer who must make use of color in the finishing of his products is not concerned very deeply with the physics of the phenomenon, but rather with the effect. He is interested, therefore, in the subjective values of color. The difficulty, however, lies in the fact that while color values are subjective, his interest in them is objective. This objective interest calls for some standard outside of his own mind, universally accepted, by which color and its values may be accurately measured. Many standards have been devised and presented. However, there seems to be one standard of measurement that is gaining rapid and widespread recognition

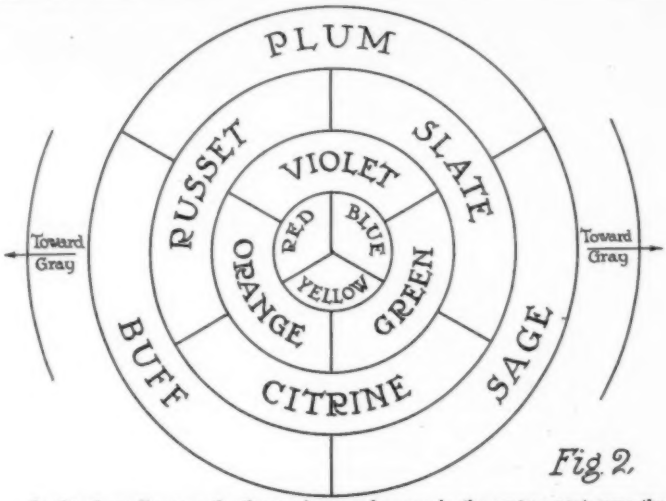


Fig. 2.

In the above diagram, the three primary colors are in the center; next come the secondary colors, each being obtained by mixing equal parts of two adjoining primary colors, for example: Red and yellow make orange; yellow and blue, green; red and blue, violet. Then come the tertiary colors: Russet, citrine and slate; and so on until continued mixing produces grays, the same as a mixture of white and black.

. . . . the one devised by Albert H. Munsell, the great color scientist, to measure and define the appearance of any color in terms as exact as those of mathematics.

And like one branch of mathematics, color, as defined by Mr. Munsell, has three dimensions. The color dimensions so defined are hue, value, and chroma. (See Fig. 1.)

Hue; Value; Chroma

Hue is the quality of color whereby the normal eye differentiates one color from another, as red from green, blue from orange, etc.

Value, sometimes called shade, is the position of a color in the light to dark scale. A high value red, for instance, is a light shade of red; a low value red is a dark shade of red.

Chroma is a measure of purity or intensity of hue; that is, the degree of gray present in a given hue of a given shade. For example, a pure light green is green in hue, high in value, and *strong* in chroma; but a light, olive green is green in hue, high in value, and *weak* in chroma.

The Principal Colors

From the three primary colors, red, blue and yellow, all other colors can, of course, be made. The mixture is equal parts of any two primary colors produces a secondary color, of which there are three: orange, green and violet. The mixture in equal parts of any two secondary colors produces a

tertiary color, of which there are also three: russet, citrine, and slate . . . . and so on. The new groups formed will tend to become less and less characteristic, and the colors within them more and more similar, until finally the result is a uniform neutral gray incapable of further combination and variation. This final result can be obtained at once by mixing equal parts of all three primary colors. (See Fig. 2.)

Color Harmony; Contrast

Color is analogous to music in many respects, and one of these is the matter of harmony. A single color, like a single musical note, is neither discordant nor harmonious. But several colors in combination, like several musical notes struck simultaneously, produce either harmony or discord. In the manufacture of any product whose finish consists of more than one color, this point is of real importance and has a practical effect upon sales.

There are harmonies of contrast and harmonies of analogy. Contrasting colors tend to intensify and enliven each other, and for this reason they are an excellent means of attracting attention. In analogous colors the harmony is less spectacular, and for this reason perhaps esthetically more satisfying. In the circular chart marked Fig. 3, the complementary contrasting colors may be found by drawing a straight line from any point on the circumference, through the center to the opposite circumference. The colors represented by the ends of the line will then be true complementary contrasts. Analogous harmonies are represented by neighboring colors on the circumference of the circle.

Effects of Black and White

Color is affected by the presence of black and white. When white is used to separate two different colors it has a tendency to make both colors appear higher in value and stronger in chroma. Black, placed between the same two colors, also strengthens their chromas but lowers their values. Since both black and white have a

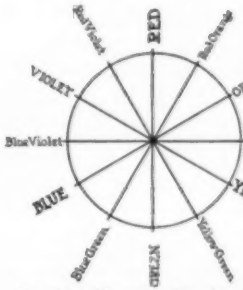


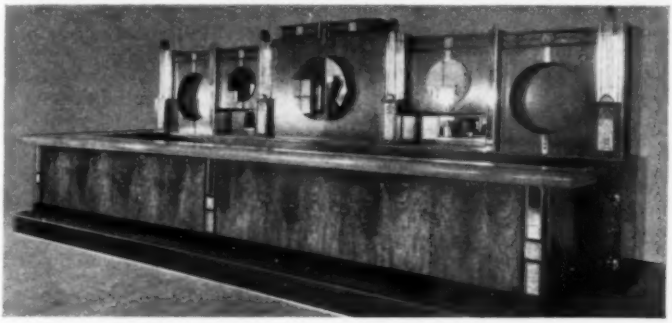
Fig 3

In this diagram the complementary contrasting colors are found by drawing a straight line from any point on the circle through the center to the opposite point; for example, red and green, red-orange and blue-green, orange and blue, and so on around.

strengthening effect upon the chromas of adjacent colors, they both make excellent color foils, exaggerating the importance of the colors in question and giving them added vigor.

Also, colors that tend to clash may be made to harmonize by the addition of white or black. And this latter rule applies regardless of the manner in which the white or black is added. For instance, if, as mentioned above, either the white or the black is added in a pure state as a separating unit to the composition, it will prevent clashing by that very separation of the opposing colors, even while

FINISHES



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it enlivens the colors themselves. On the other hand, if white or black is added to each of the two colors in question, rather than being employed as a separating unit, it will also tend to harmonize them, since it will act as a "common denominator" for both. Of course, in that case it will modify both their values and their chromas.

Making Colors Harmonize

The presence of any common hue (as well as black or white) in any two otherwise clashing colors will tend to bring them into harmony, particularly if that hue is derived from one of the two colors in question. In plainer language, if you have two colors that clash and you want them to harmonize, take a little of one of the colors and mix it into the other. A brilliant red and a brilliant blue fight like the gingham dog and the calico cat, but if you take a little of the red and mix it into the blue, it will be a step toward analogous harmony, since red will be the common denominator of both colors. The harmony will be even better if, in addition to adding a little red to the blue, you also add a little blue to the red. You will then have red with a blue cast and blue with a red cast, or if larger quantities are intermixed, you will have two tones of purple. Of course, if you carry the process to the absolute extreme, you will end up with simply one color: a pure purple. But the point is that analogous harmony is increased as contrast is decreased; the one is in inverse ratio to the other. This rule applies to clashing contrasts, and not of course to harmonious contrasts. There's a difference here.

Color Contrast

Because contrasting colors enliven each other, and have greater attention value than analogous colors, they are advantageously employed in the finishing of a great number of articles such as toys, novelties, metal specialties, etc. It is therefore well to know some of the rules by which color contrasts may be obtained.

Complementary colors, for instance, are always contrasting colors. Given any one of the three primary colors, its complement is obtained by mixing equal parts of the remaining two primary colors. The complement of a primary color, therefore, is always a secondary color. Given any one of the three secondary colors, its complement is made of the two remaining secondary colors, which combined is always a tertiary color. And so on. (Refer to Fig. 2).

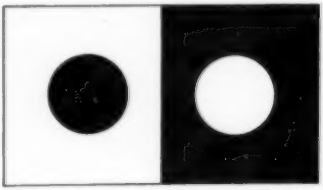

Fig. 4 — In this typical illustration, the black circle on a white field appears smaller than the white circle on a black field, although both are the same size. Haven't you noticed that the circus thin man is dressed in black to make him appear thinner, while the fat lady is dressed in a light color to make her appear larger?

The use of a high value color with a low value color is another method of achieving contrast. Or a strong chroma color may be used in connection with a weak chroma color. Or a warm color may be used with a cold color to achieve a very desirable contrast.

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Lustrous Finishes at Low Cost

GREATER SPEED · PERFECT ATOMIZATION
MINIMUM AIR PRESSURE DROP
LESS AIR CONSUMPTION · HANDLING EASE

Specifications

Gun Body: Drop forged aluminum with black electrolytic coating for surface protection.

Gun Head: Drop forged bronze, chromium plated.

Air Nozzle: Drop forged bronze, chromium plated.

Material Nozzle: Stainless Steel hardened and ground.

Fluid Needle Valve: Stainless Steel hardened and polished. Floating and self-centering, adjustable to compensate for wear.

Air Valve Assembly: Floating and self-centering construction.

Material Control: Sensitive from closed to full open position.

Spray Adjustment: Located on back of gun with adjustment from round to full width of spray and all intermediate positions.

Fluid Connection: Standard ⅜" pipe connection or any connection desired.

Air Connection: Standard ¼" pipe connection or any other connection desired.

Nozzle Centering Principle: Tapered seat construction.

Wear of Gun: All moving parts made of stainless hardened steel.

Weight of Gun: Light of weight with comfortable grip.

Balance of Gun: Ideal for continuous handling.

Pressure Drop Through Gun: Lowered to absolute minimum within practical limits.

Smart Finishers Have Been Waiting Fo

Warm and Cold Colors

Of the three primary colors, the warm colors are red and yellow; the cold color is blue. As all other colors are made up of these three, the warmth or coldness of any other color will depend upon which of the three primary colors predominate. Although red and yellow are both warm, it should be noted that red is much warmer than yellow. Thus green, which is made up of both yellow and blue, is a cool color, because, while the blue is definitely cold, the yellow is only slightly warm. Purple, being made of red and blue, is more nearly neutral in this respect; if it is a reddish-purple, it will be warm, if a bluish purple, it will be cool.

Another means of obtaining contrast is to set a large area of one color against a small area of another.

It should always be kept in mind that color, being itself reflected light, is always affected by the kind and amount of direct light to which it is exposed. For instance, colors that would seem to be blatant and in poor taste in dull overcast climates, will appear pleasing and in good taste in sunshiny climates. Brilliant colors always appear at their best in bright sunshine, whereas in a climate that has but little sunshine they will tend to clash. Sunshine, then, may be termed a harmonizing agent. Distance is also a harmonizing agent, and for this reason brilliant colors are better for outdoor than for indoor use.

The finisher dealing with color should not overlook their psycological values. Red is stimulating, warm, animated. Green, its complement, is restful, cool, refreshing. Blue is cold, clean, suggestive of wide spaces, lonely. Purple, in large areas, has melancholy associations. Yellow and orange are cheerful and animated.

Color's Influence as to Size and Weight

Color also has an effect upon the apparent size of the article finished. The same object finished in colors of strong chroma and high value, appears to be larger than when finished in colors of weak chroma and low value. This phenomenon can be illustrated in black and white, for although the color is absent, white obviously has the highest possible value while black has the lowest. It will be noticed in Fig. 4 that the white circle appears to be larger than the black one. Actually, they are both the same size.

In addition to apparent size, color also affects apparent weight. If an object is painted red, orange or black, it will appear to be heavier than if it is painted yellow, blue or green.

Fading Colors

It should be kept in mind also that certain colors, when used in almost any type of finish, have a greater tendency to fade than have other colors. Purple, magenta, violet, pink, light blue and light maroon all tend to fade when exposed for long periods to direct sunlight. For this reason they make poor finishes for articles intended for outdoor use.

Certain colors have greater visibility than others. Orange and red stand out strongly. Blue, green and purple, are less readily distinguished, particularly in failing light.

The subject of color is inexhaustible; volumes could be written and still leave much unsaid.

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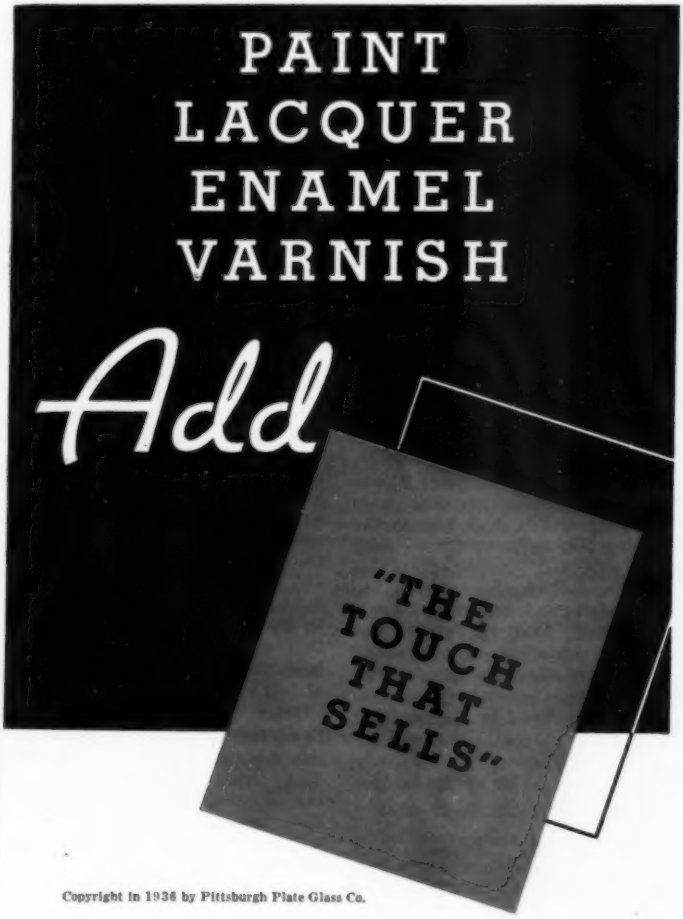

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Synthetic Enamels . . . Spraying and Patching — II

by
George Arnold Endom

Second and final part of an interesting, informative article dealing with practical specific facts and suggestions about the spraying of synthetic enamels in production finishing, including detailed directions for successfully patching any defect in a new synthetic enameled surface.

★ ★ ★

RATHER than put myself on record stating that synthetic enamel or any other material must be sprayed at certain positive pressures, I will give some figures at which I have accomplished highly satisfactory results. At times we encounter some extremely large surfaces. A wing or fuselage may run into a continuous unbroken surface 14 to 18-ft. by 85 to 120-ft. long. When this is calculated into square measure it will be seen there is a considerable area to be coated.

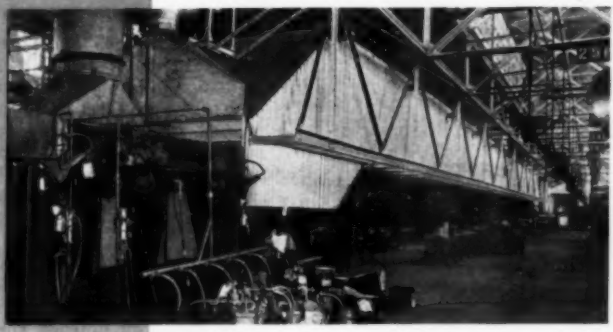
With pyroxylin lacquers it was absolutely necessary that once spraying a side had begun, the coating had to be continued until that side was completed; otherwise a dull section at the lap (caused by air-marking) would be noticed. Even spraying a wet coat of retarding reducer would not always eliminate these marks. With oil-base enamels the surface could be sprayed in sections, but even with this material it was advisable to spray continuously, both for the sake of appearance and for speed.

Spraying Pressures

Using a 10-gallon pressure tank on this class of work, I have found that the average experienced sprayer can spray pyroxylin lacquers to the greatest advantage of all concerned at a fluid pressure of from 8 to 10-lbs. with an atomizing pressure of 70 to 80-lbs. Viscosity of material and spray equipment govern the above also. I am assuming that standard spray equipment with ⅜-in. fluid hose, high pressure gun and E, FF, or F nozzle is used, and that the material is thinned at least 50% from the standard furnished by the paint manufacturer.

With the same equipment I have found some sprayers who ran their fluid pressure to 18-lbs., with atomizing pressure at 90-lbs. or over, but these are exceptions and I have only known of a few individuals who could turn out first class work while using such extremely high pressures.

Industrial OVENS



. . . to Meet Every Production Need

The large illustration shows a large convection type drying oven installed at the General Motors Truck Plant. Above: A typical high temperature oven designed and built to meet the manufacturer's specific requirements.

Industrial Ovens in modern production systems require specialized engineering. Each installation must be designed to accommodate a particular product and to fit in with the general production layout. Mahon engineers, whose experience covers years of close contact with every industry, provide the specialized engineering service and the practical experience so necessary to insure efficient oven performance.

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Designers and Manufacturers of Industrial Ovens of all types, Spray Booths, Rust Proofing Machines, Metal Parts Washers, and many other units of Special Production Equipment.

In coating with oil-base enamels and varnishes under the same conditions I would say that a much lower atomizing pressure could be used. From 50 to 60-lbs. of air to break up fluid at 6-lbs. fluid pressure is one of the most satisfactory arrangements, but these finishes allow a wide range in pressure either way.

Spray Gun Nozzles

Returning to synthetics — both enamels and lacquers — I am of the opinion that to spray these materials properly the first thought should be the selection of the proper nozzle size and design. Most spray gun manufacturers have designed and perfected improved models for synthetic finishes. In many instances the synthetic gums in these materials caused trouble at the fluid tip or in the mixing chamber, by either clogging partially and then discharging this set or partly set material in the form of specks or lumps, or by improper breakup, uneven spray or split-spray.

Using the proper size and design of nozzle, it is then only a matter of always using sufficient atomizing pressure to form the fine mist which is so necessary in finish spraying; and then always apply wet coats. In the case of synthetic enamels or lacquers it is far better to experiment with various pressures until the ideal combination of air and fluid has been discovered, than to adopt anyone's suggestions — for the several manufacturer's products vary so widely, both in viscosity and flowing qualities, that what pressures will be suitable for one may result in total failure in another. Also, shop conditions vary, and the final use to which the part being finished is to be put must be considered; and remember there will always be considerable variance in the final finish when an attempt is made to thoughtlessly state: "Spray somewhere between 40 and 80-lbs.," for this is a wide range of spraying pressures.

Patching Synthetic Enamels

Several months ago there appeared in INDUSTRIAL FINISHING an article about the difficulty of patching any defect in a synthetic enamel coat without recoating the entire side or section. I believe the writer had some trouble in eliminating the ring or airmark or shadow caused by the overspray.

I read this article with interest for I have had a considerable amount of patching and repair work to do on finished surfaces, and I have experienced much of the same trouble. I have managed to overcome this, however, by using the following method:

1) Carefully dry-sand the defect, mar or damage (feathering the edges of chipped sections) and wipe clean.

2) Apply a light coat of very thin primer with a touch-up gun, using just enough air pressure to draw it through the nozzle. (I usually use about 8-lbs.)

3) When the primer is dry, if the damaged part has a deep scar or is lower than the surrounding surface, I glaze this with a knife, using a meal glazing compound (synthetic) furnished by the manufacturer of the synthetic enamel I use. When this has dried, which takes approximately 12 hours, I water-sand with the No. 320 wet-or-dry

Visit the M & W Booth at the Platers' Convention

Here you will find a comprehensive display of M & W finishes—and also representatives who are expert in the art of lacquering and have had wide experience in meeting the finishing requirements of industrial users.

METALUSTRE, *the lustrous, durable metallic enamel which covers well in one coat, is one of the features of our display.*

We wish to thank our many friends who have helped to make our Cleveland exhibit so interesting and we hope it will create new friends to our mutual advantage . . .

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sandpaper, and then wash and dry carefully.

Where the damage has not scarred or deeply indented the finish and does not require spot glazing with a knife, the spraying of one or two coats of the glazing compound, thinned sufficiently, will provide enough build; and after sanding the repair should present a continuous film with the surrounding surface.

4) Next, I spray from two to four coats (depending on the hiding qualities, the build and the color) in ever increasing circles. By this I mean first apply a coat to the center of the repaired spot, lapping it about ½-in. over the edge. The second coat, after about half an hour, extends about ½-in. beyond this, and so on until sufficient material has been applied to give the proper finish.

The material is purposely thinned to its limit—"as thin as water"; this allows a low spray pressure, always under 10-lbs. If you follow these instructions carefully you will get a patch job without even a sign of dullness showing, after being wiped briskly when dry with a rag which has been moistened with suitable polishing oil.

I have not mentioned masking around the section being repaired, as the low spray pressure used does not require this, and many times the marks left by masking are more unsightly than the original damage. A little experimenting, the use of good judgment and care will eventually repay you in time saved and in improved "looks."

Synthetics Seem Superior

In the final analysis regarding products containing synthetic resins or gums, I do not know what the opinion of others may be on the subject, but I do know that viewing the material from several angles I have about arrived at the conclusion that synthetic enamels are in many ways far superior to the former types of finish—both enamels and pyroxylin lacquers.

With the developments and improvements being incorporated those synthetics being marketed by several reputable manufacturers, have better build, greater coverage and hiding power, and they flow out to a smoother finish and dry with a higher gloss.

Their comparative ease of application together with the labor saved in sanding and final polishing make them ideal for nearly every kind of metal protection and beautification.

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A letter from the U. S. Testing Co., Inc., 1415 Park ave., Hoboken, N. J.:

"The Specialist; that's us.

"We are specialists in chemical testing and micro-chemistry. Specialists need special equipment; we have it. With micro-chemistry complete and accurate analyses may be made on very small samples, even minute particles.

"Recent years have shown great advances in the development of chemical microscopy; new accessories, refined laboratory technique and new methods.

"We have kept abreast of these developments in chemical microscopy and have established a special laboratory devoted exclusively to chemical microscopy.

"The principal secret of good chemical microscopy is knowing what to look for and how to interpret observations. This skill can come only through years of experience by a chemical microscopist possessing a delicate and refined technique.

"We have a booklet showing our scope of work that is yours for the asking."

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Provides a film of unusual *depth* and hardness with excellent adhesion and durability.

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Is equally satisfactory for spray application.

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Lacquer Finishes Protect

Photographs, Prints and Painted Decorations

by Art. C. Heberer

A thin transparent film of clear lacquer gives a splendid lasting protection for the faces of highly prized photographs or enlargements, etchings and color prints, as well as lithographed or hand painted decorations placed on the surfaces of novelty goods.

THROUGHOUT the years, artisans of every craft have endeavored to perpetuate their handiwork and render it impervious to the ravages of time. When this effort is directed towards the preservation of photographs, cherished and irreplaceable as they are, it receives the enthusiastic endorsement of every layman as well as the profession.

A method which protects and preserves photographic likenesses also answers perfectly the increasing demand for a protective lacquer finish for Godey prints,* in which there has been a marked revival of interest.

That is why a method which has been tested and found eminently satisfactory will be of value to many who have heretofore encountered difficulties in perfecting a lacquer finish for this purpose. While this method does not involve a new type of finish, in the past few years it has been so tremendously improved upon that most of the difficulties previously encountered have been eliminated.

In the past, most of the trouble has been due to the type of glue used in pasting the print or photograph onto veneered wood and cardboard. Frequently this caused blisters, and the raised places showed up badly on the work when it was finished with lacquer.

Experience has proved that the best way to make the glue adhere to the article being treated is as follows: Use the very best grade

*Artistic, delicate fashion prints on thin paper, often tinted by hand with water colors, which appeared in Godey's Lady's Book, the first woman's periodical in the United States, published by Louis Antoine Godey at Philadelphia during the year 1830 to 1877. The naivete and charm of these pictures, as well as their historical value as records of America's past, make them of interest to collectors and decorators, as well as libraries and museums.

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73 Years Experience in "Better-The-Finish"
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Varnishes Enamels Japans Lacquers

of paperhanger's paste. To one gallon of this paste add a handful of brown sugar. Stir well until thoroughly mixed, then strain through a cheesecloth until perfectly smooth. After applying this paste to the print or photograph, smooth out well to release any air that may be entrapped under the paper print. Then allow the print to dry over night or, if desired, force drying may be substituted. However, best results in the final finish are obtained by drying in room temperatures, or between 70° and 80°F.

In the event that you are using prints or photographs over veneer stock, simply bring your wood up with the stain and fillers and let dry over night before applying the print. On cardboard or prepared wood, simply apply the paste directly on the stock.

The next operation is to spray one coat of water white sealer. Allow this to stand from three to four hours before sanding with No. 6/0 or 7/0 sandpaper. This coating must cover all the article in process. Then apply one or two coats of water-white gloss lacquer. No further sanding will be necessary unless specks or grit are found on the work.

Some concerns sell their work finished in this manner, although others demand an even better finish. This can be obtained by rubbing the last coat of lacquer down with No. 4/F pumice stone, using oil or water when rubbing.

After this final rubbing process, allow the work to stand about five hours and then polish with a good grade of lacquer compound. This will give the appearance of a glass covering the print or photograph, and makes a very attractive protective finish.

Carnauba Wax

THE FINEST polishes, for wood or leather, are mixtures containing a considerable proportion of carnauba wax, either emulsified in water mixtures with the aid of soap, or in turpentine solution, along with paraffine, ceresine, and other modifiers. Carnauba wax is the yellow dust that forms on the leaves of a particular palm tree of Brazil, but only when this tree grows under desert conditions. It helps the trees withstand low humidity. When attempts are made to raise the trees in moister places, beautiful foliage is obtained, but no wax. Natives scrape the wax off, then boil the leaves to remove part of the residue.

The demand for carnauba wax is increasing faster than the supply, and various measures are being taken to protect the industry and yet to correct this condition. The State of Ceara, in Brazil, is trying to prevent seeds of the tree from being exported to other countries, while the municipality of Caraubas is offering prizes for the largest plantings of trees (in proper desert land), and the President of Brazil has offered a prize of $4,000 for the invention of a machine for securing a larger proportion of the wax of those trees that are worked.

A large American floor-polish manufacturer is conducting an exploration party which hopes to discover new areas of producing palms. Even with all these aids, however, the price is rising so fast that great interest is being taken in finding adequate substitutes for this valuable wax.

Vegetable substitutes for carnauba are apparently not forth-

* * To Help You Find the One Best Enamel For YOUR Product

Hundreds of manufacturers of many kinds of products use Day's Enamels. They have found that these materials may be depended upon to make their products outstandingly attractive. Our services consist of these essential functions:

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coming, in spite of world-wide search, which has shown only sugar-cane wax and raphia wax as even remotely like carnauba, so that the main effort now has turned to the use of synthetic (or more correctly: semi-synthetic waxes) based principally on "montan" wax. This is a fossil residue of the waxes of former plants and is found in peat, brown coal, shales, lignite and other remains of plant material.

Many patents have been taken out for processes of extracting, purifying, hydrogenating, bleaching, and otherwise improving the brown-black montan wax to make it serve some of the uses of carnauba and other waxes. Mostly, these refined products have been very expensive, but recently a large American manufacturer has produced a whole line of waxes at reasonable prices, with melting points from that of beeswax up to that of carnauba wax (184°F.). These aroused a great deal of interest at the recent chemical show in New York, which resulted in requests for hundreds of samples for trial.

As with many other manufactured products, duplication of a specific natural material is not the only goal. It is frequently possible to improve on some of the characteristics of the natural material, even if others may not be quite fully attained. Some relatively new synthetic waxes have melting points far above that of carnauba wax, yet are not brittle.

Doubtless the so-called "synthetic" waxes will not only produce results formerly obtained only by carnauba wax, but will do things not possible before. Waxes are useful not only for polishing, but in putty compositions, as an ingredient of rubber, and as an impregnant for wood and other porous materials. These newer products should not be expected to replace entirely the waxes one may now be using, but, with proper experimentation, they may be found to achieve the same result, a better result, or a less costly product. — INDUSTRIAL BULLETIN of Arthur D. Little, Inc.

American Toy Mart—Chicago

Establishment of the American Toy Mart, a permanent display center for the toy industry, on the fifth floor of the American Furniture Mart, 666 Lake Shore Dr., Chicago, Ill., has been announced. A centralized, well-organized permanent headquarters at Chicago is considered certain to bring a considerable number of toy buyers to Chicago from all directions, inasmuch as Chicago is the natural geographical buying center. The American toy industry today is doing an annual business of more than $100,000,000.

Detroit Rex Products' Eastern Office Moved

The Detroit Rex Products Co., 13008 Hillview Ave., Detroit, Mich., manufacturers of Detrex solvent degreasers, Triad and Perm-A-Clor noninflammable solvents, and a complete line of Triad alkali cleaning compounds and enamel strippers, has moved the offices of their Eastern Sales Region to Bush Terminal Sales Bldg., 130 W. 42nd St., New York, N. Y.

This region, under the supervision of D. E. Williard, Eastern Sales Manager, consists of the New England states, the southeast corner of New York state, eastern half of Pennsylvania, New Jersey, Delaware and eastern Maryland. The various representatives covering this territory will work out of Boston, New Haven, New York City and Philadelphia.

By this division of the territory, the company is better able to service its accounts and render a consulting service on metal cleaning to the finishing industries. This arrangement is in line with the recent general expansion of the company's sales and engineering forces, and additions to its line of solvent degreasing machines.

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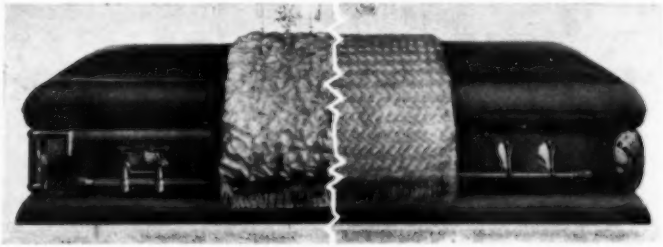

Right and left halves of two different metal caskets. Photograhs from which this cut was made, were supplied through courtesy of The American Crown Casket Co.

Metal Casket Finishes

by M. Langius

METAL CASKETS come to us covered with a thin film of grease or oil to prevent rust while in storage and in transit. To clean the metal surfaces we use steelwool dipped in cleaning fluid, which is none other than a cheap grade of thinner. The surfaces must be thoroughly washed, wiped dry with a cloth, and then sanded with fine sandpaper to clean up any smears and possible dirt particles. Then we dust off or "blow off" the surface with compressed air.

Finishing begins with a thin spray coat of non-sanding lacquer primer. Next we apply the color coat which may be one or a combination of colors.

Having some knowledge of industrial design, color, finish and construction, and having been a manufacturer and salesman of caskets, also traveling finisher, I have found through contact with wholesalers, jobbers and funeral directors what finishes are now receiving the greatest attention. In this article I am presenting some steps in the finishing of metal caskets, and their various attractive color combinations.

Deluxe Silver Finish

A large percentage of metal caskets are sold in deluxe silver finish. This is usually produced with a material consisting of silver bronze powder mixed with a suitable quantity of thinner to which is added clear lacquer for adherance—the consistency of the final material to be sprayable at

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50-lbs. air pressure. Over this silver bronze we spray a clear water-white gloss lacquer, putting on a double coat, which is none other than twice around.

Be sure that all coats are flow coats, leaving no overspray. I would suggest adding a little retarder, due to the amount of surface necessary to cover. Be sure all equipment and material are clean, as on this depends the finished product. When this double coat of clear lacquer is thoroughly dry, our next step is to spray on a thin wash coat made up of about 30% lacquer and 70% thinner, to produce a smooth lustrous finish. Be careful to avoid any resemblance of orange peel or overspray effects, as this will require a lot of rubbing.

We do our rubbing with a rotary disc on which we can use different grades of felt pads and sheep skin polishers. The disc is connected by a flexible shaft to a small motor suspended overhead. These machines are used in automobile plants for buffing and polishing bodies. To rub, we use a rubbing compound thinned with water. One must be careful at the edges to avoid rubbing through. After the entire casket has been gone over, remove the rubbing pad and replace it with a sheep skin polisher. This will give a beautiful, clean, high-polished finish.

The building up of a plain finish is the same on all casket shells. Rubbing and polishing classifies them as to price at this stage of preparation. The application of hardware and interior trim are other steps which diversify the price range still further.

The finish just described produces a beautiful silver bronze effect. Other metallic finishes in different colors are produced in a similar manner, as for example, pale gold bronze, statuary bronze, and smoky gray which is a black lacquer enamel added to silver. Also flesh, orchid and white, which are color enamel finishes.

Attractive Novelty Finishes

Now I will describe a novelty finish that is very beautiful. The entire shell is sprayed a Venetian bronze which is statuary—our color coat. Now on the body panel, which is between the base and top moldings, also on the top panels, we apply with a brush, dabs of coppertone bronze. The vehicle consists of a mixture of equal parts turpentine and japan drier. Paint the surface mentioned with a mixture of turpentine and drier; then dip the brush in the bronze mixture and dab or pounce here and there. The bronze will spurt out in all directions, producing an effect like marble. If you do not like the figure, give the surface a few more dabs with the turpentine and drier mixture. This will start it working all over again, producing different figures. When dry, spray on a coat of clear lacquer, and rub.

Another beautiful combination consists of a black color coat with silver dabbing or pouncing, and silver stripes on the base molding and top moldings. Again, another combination is a white ground coat, with the body panel and top panels dabbed or pounced with silver or gold bronze. Stripes of silver or gold are added on the moldings with a mechanical striper.

Smoky Gray and Silver

Now let us spray a color coat of smoky gray on the casket shell. Shade the top and bottom edges

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From one twenty-gallon kettle, Berry Brothers factories have grown to cover seven and one-half acres of ground space. Its finishes protect hairpins and air liners.

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of the body panel with silver bronze. Now place a 1-in. strip of masking tape carefully all around the outer edges (the sides and ends) of the top panels. Apply it straight and even, as this is to mask out a finished stripe. Then, about 1-in. inside of this border, place another 1-in. strip of masking tape, laying it on very carefully. Now spray the entire top with silver. Remove the tape and you will have two 1-in. stripes of smoky gray. Now along the bottom edge, about 1-in. up on the base molding, run two ⅛-in. stripes of silver about ¼-in. apart.

This combination of silver and smoky gray gives a beautiful effect. There is just enough difference in the tone of the two colors to make the job especially attractive. Hardware should be nickel and silver bronze or antique silver. The same finish will work out well in coppertone and Venetian or pale gold or deep gold. In fact your finisher can visualize various beautiful effects and work out his own original color schemes.

Use Quality Materials

In conclusion, let me empahsize the fact that it is important to use quality finishing materials, even in casket finishing. Caskets are made to be buried but it takes quite some time for many of them to get under the ground. Thousands of them remain on showroom floors for a considerable time. I have seen cloth-covered caskets that were faded, and metal finished caskets that turned yellow, especially silver shells. Also, I have seen metal shells going through the factory, that had been placed near windows in factory finishing rooms waiting to be rubbed, or waiting for the application of hardware or interiors. They turned yellow and faded in one week's time. Caskets are in a competitive field, the same as everything else, which necessitates close buying. In some cases cheap material is used with the idea that, "Oh well, it's going under the ground anyway," but do they? I have found caskets in showroom that had been there as long as five years . . . . lots of them one and two years.

Editor's Note: In another article, to appear later, this author will discuss the finishing of fine hardwood caskets.

Facts About Lignum-Vitae

Lignum-Vitae is a very hard resinous wood grown in the tropics. It is the hardest, heaviest and closest grained wood in the world, with a density almost equal to iron. It weighs about 80-lbs. per cubic foot, having a specific gravity of 1.14.

The high resin content of lignum-vitae, which runs about 30% of its weight, consists of a natural gum which, combined with its pressure resisting quality, renders this wood admirably suited for an ever increasing number of mechanical purposes where the introduction of lubrication is not practical or at all times reliable—for example, in food and liquid-handling machinery, where oil cannot be used to lubricate bearings or bushings due to the possibility that the lubricant might find its way into the product. In the chemical trades, it is highly valued because of its ability to resist many acids and chemicals. Water acts as a preservative and a greatly added lubricant to lignum-vitae. It is rustless and its natural gum or resin protects it when coming in contact with corroded surfaces.

Its extreme hardness does not render it unworkable by any means, but rather enhances its value to the commercial arts. It has been successfully worked within remarkable limits of accuracy to produce a practically limitless variety of parts used to great advantage in mechanical equipment by many of the world's leading manufacturers.—LIGNUM-VITAE PRODUCTS CORP.

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Color Rubs Off

A manufacturer of dress ornaments made of wood and finished in color, recently sent in a flat embossed wood ring about ¼-in. thick and 2¼-in. in diameter, finished in bright red. He complained about "having some difficulty in securing a color that will not rub off our buttons."

The "feel" of the finished ring indicated that it has been waxed after having been colored with a pigmented stain or thin paint. We could mark with it on white paper, just like using a waxed crayon. Evidently the vehicle of the pigment stain had penetrated the wood, leaving the pigment on the surface, after which the applied wax had combined with the color to form film not unlike wax crayon or lipstick. Naturally it would mark, although plenty of apparently permanent color still remained on the wood surface.

We suggested to the manufacturer that he change to a lacquer enamel or synthetic enamel, wherein the color will be well bound into the film and will not rub off when dry. Several makes of good lacquer enamels are available which will give a satisfactory one-coat finish with good adhesion to the wood, and a suitable luster.—EDITOR.

Rosewood Veneer Checks

We have been referred to you for advice in the solution of a finishing problem which is giving us considerable trouble and, incidentally, it is causing us no little expense.

In the construction of certain high grade instruments, we are employing a 3-ply stock consisting of a 1/20-in. rotary-cut gumwood core and two outer veneers of 1/20-in. rotary-cut East India rosewood.

When these instruments reach our finishing room, it is frequently observed that the rosewood veneer has developed numerous checks anywhere from ¼-in. to 1-in. in length. We have satisfied ourselves that these checks are in the rosewood veneer when it leaves the mill, but they are not discernible until aggravated by sanding and finishing materials, and they insist upon showing up after the instruments have gone through the several operations in the finishing rooms, including glue-sizing, filling, several coats of lacquer, rubbing and polishing.

In the building-up of the stock referred to, we are certain that the tight side of the veneer was turned to the outside.

Will you not submit our problem to one of your authorities on finishing rosewood? We would be deeply grateful for any advice which would help us overcome this difficulty.—T. Musical Instrument Co.

I have talked this problem over with our Mr. Sharon, who was superintendent of our factory in France for 27 years. He has had considerable experience with rosewood veneer, etc. Mr. Sharon says

Questions « Answers

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FINISHES DU PONT

that first they always used hide glue for this veneering, with real hot cauls. The glue, when applied to the gum wood core, should be allowed to set for a few minutes before the rosewood veneer is laid. Let the glue get tacky. Then lay the veneer and get it under pressure as soon as possible, so as not to permit the veneer to take on moisture from the wet glue and expand. By allowing the glue to become tacky or free from excess moisture, and using real hot cauls, and getting the work under pressure just as quickly as possible so as not to allow the expansion of the rotary-cut veneer, which takes up moisture quickly and expands rapidly—this ought to help solve the problem, if you are using good veneer to start with.

If you are using cold glue and stacking the work before placing it under pressure, that is, veneering 15 or 20 pieces at a time, you will surely have trouble. Veneer one or two pieces at a time and get the work under pressure just as quickly as possible.—F. W. PURDON.

I am sure that the checks in the rosewood veneer are in the veneer before it is laid, but they do not show until finishing material is applied. I find that a fairly heavy glue size, sponged on this wood before finishing, helps to overcome this trouble. The glue size should be rubbed into the wood quite well and then wiped over again to remove the surplus of glue on top of the wood. Then, after drying several hours, it should be sanded with fine sandpaper.—FERD. ROSEN.

In the first place, does your core run crosswise of the face veneer? It should, by all means. Now the trouble, as I see it, is that the rosewood veneer is not dry enough before it is laid. It should dry to about 4¼% to 5% moisture content, not more than 6%, for I feel sure the veneer, as it goes through the finishing room, drys out more than what it was before it was laid. This will cause it to check. Dry it to the above-mentioned moisture content and keep your relative humidity at 42%. Then I don't think you will have any trouble. I take it for granted that you fill the rosewood veneer.

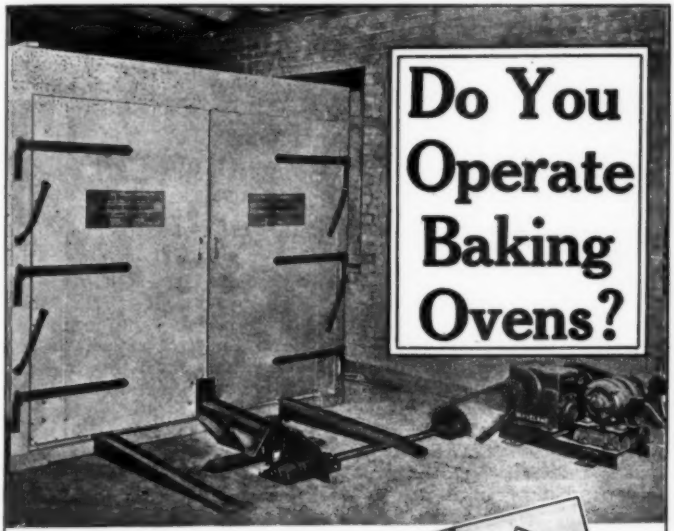
There are so many things that can cause checking, I could tell more about it if I saw the veneer. I would appreciate it very much if I could get just a little piece of that veneer.

You will run into more checks when using rotary-cut or sliced veneer than you would if you were using sawed veneer. I suggest you try some sawed veneer and I think your troubles will be ended. After you have checked this up, I would like to hear from you, as I have finished lots of rosewood veneer.—BEN J. STUDER.

Finishes on Paper

We are interested in getting all the information you can give us on "Finishes on Paper." Also, can you give us a list of materials which are soluble in water and when dry, are waterproof when given a coat of either shellac or lacquer?—K. Products Co. (Moulded Fibre Products).

Much work has been done on waterproof finishes for paper with lacquer emulsions, mixtures of special dextrines or starches and



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caseins. The most satisfactory results have been obtained with lacquer emulsions. However, low cost is very important in all fields of paper coating. For porous and absorbent paper surfaces the lowest cost satisfactory material we know of can be sprayed either by hand or automatically, and on flat sheets it can be roller coated. Roller coating is the most economical method.

The succeeding coat of lacquer is then applied, either by automatic spray or roller coating. Flexibility in a heavy film has long been attempted and, in a degree, has been successful until today there is a film that is permanently flexible and has the desirable qualities of high gloss, waterproofness and durability. As each of these paper coating problems is distinct in itself, it is often necessary to adapt special experience and products to the particular needs required.

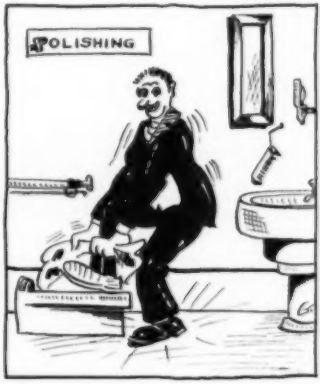
Generally speaking, without further information, a sizing coat made on the lines as described above should work satisfactorily when followed with a proper waterproof lacquer coating. — H. E. CUDNER, President, Cudner & O'Connor Co.

Spray Finishing in Two Colors

We usually finish the various articles of our manufacture in one shade or color of finish, but now we have an order for about 60-ft. of altar railing made of birch, which is to be finished in white enamel and mahogany. The top and bottom or foot rails are to be in mahogany. The balusters, molding under top rail, and the spaces between balusters are to be in white enamel. With a hand brush this would be simple enough, but how would you go about spray finishing this job?— S. Mfg. Co. (Church Furniture).

This job can be spray finished by either finishing the different parts before assembly, or by masking with gummed tape and masking paper. You will probably want to do the finishing after the woodwork has been assembled, therefore we suggest the following procedure: Plan on finishing the top and bottom rails in mahogany first. To do this you must first hide with masking paper all the balusters, moldings and spaces between balusters. Finish the rails completely before removing any of this masking material. Be sure to do the masking carefully so as to exclude mahogany stain from any surface to be painted white later, as the mahogany color will probably bleed through the white and ruin the appearance of your finished job.

Then remove the masking paper



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***Offices and Plant*—ELIZABETH, NEW JERSEY**

from the balusters, moldings and spaces between balusters, and hide the finished rails completely with masking tape and paper. This masking must be done neatly and carefully, just as it is done in automobile finishing and refinishing. Now you can spray the finish on the balusters, moldings and spaces between the balusters with your white coats. A good masking tape for this work is advertised in this magazine.

Finishing Bobbins

In an issue of this magazine some months back (January 1936, pages 58, 59, 60) I read an article about finishing wood bobbins for the textile industry. I notice the author states that after applying enamel by dipping, and then baking, he reamed the finished hole slightly "just enough to remove any scars from the rack pins, but not to remove the enamel."

Now I am not bringing up this matter to open a controversy or to make it look as if Mr. Barber was entirely wrong in his methods, but to state clearly that I could never obtain satisfactory results that way. I realize he is careful to state that the bobbin holes should be reamed only slightly, but who can see on the inside of the bobbin to tell if this reaming is sufficiently slight to do only what he suggests? The bobbin may be slightly warped, or the different size holes in the same bobbin may be slightly off center, or the holes might be tapered by the building up of the enamel. In any of these cases the reamer is sure to remove finish on the high spots which, no matter how slight, tends to kill the purpose of the enameling operation.

Suppose one of these burrs is extremely hard and instead of being cut clean it flakes off down to the wood. What is the result? Suppose again that the operator is careless in centering the bobbins on the reamer, as is the case when work of this kind is done on a piece-rate basis. Bobbins, as a rule, are held on the spindles and centered by two points, the top and the bottom, so why take any of the above chances when a sure way can be followed? Furthermore, in my method, I always have my fixture pins so pointed and arranged that the contact marks are so slight they do not have to be considered.

Perhaps the other idea is based on a few kinds of bobbins that would come into a job shop in small quantities, but my suggestions are for finishing all kinds, shapes, and sizes of bobbins that go through a finishing department in lots of 200,000 or 300,000 at a time, where the price is so close that the manufacturer can not afford or take the chance to ream them. I maintain that my method of building up the bobbins to a perfect spindle fit with the enamel is much the better way than to ream the holes for a fit after enameling. I find that uniform results can be obtained each time by referring to records and applying the same kind of material at the same specific gravity. In cases of new orders, test lots are always put through to establish the specific gravity of the coating, based on the number of coats required.

Of course we all have our ideas and maybe Mr. Barber's method worked out all right under his

conditions, but with the very satisfactory results obtained by my method I can not help but mention the difference for the benefit of others who may be doing this or similar work. When we reamed our bobbins we were always in trouble with the moisture proposition, but when we changed over to the building up idea our troubles disappeared and things ran along smoothly.

Bobbins are enameled not only to give them a smooth attractive enduring surface, but to make them impervious to moisture. The latter purpose is the most important requirement. The proper way to handle this situation, after deciding upon the number of coats to be applied and the thickness that these coatings will produce, is to make the center hole sufficiently large to take care of this, so as to give a snug fit on the spindles when the bobbins are placed in service. I have supervised the finishing of hundreds of thousands of bobbins, following this method, and complaints were exceptions rather than the rule.

Many bobbins are made from wood not properly dried, due to haste in getting out an order, and when submitted to heat the holes shrink out of round. It is well to know that unfinished wood bobbins, if left standing for any length of time, or in shipping before finishing, will pick up moisture to such an extent that in baking after the first coat of filler, the original perfect shape, size and hole will be lost—unless they are submitted to a much lower degree of heat than ordinarily applied. When this is found to be the case, the unfinished wood bobbins should be treated with a low heat for at least 24 hours before enameling. The slow passing off of the moisture will gradually permit the wood to contract to its regular shape and dimensions, and not be warped or twisted when forced by a high heat while wet with enamel.

The fixtures on which the bobbins are held while going through the dipping process has a lot to do with throwing the holes out of round during the baking. Special care should be taken to see that the pressure is so divided that the whole force will not be in one direction.

In the near future I hope to be able to announce a method to overcome many of these troubles that bobbin manufacturers have to contend with, both before and after enameling, by impregnating the wood bobbins in a centrifugal machine. This will drive out the moisture, and fill the cells of the wood with an imprevious solution which will seal the pores and surfaces against further absorption of moisture, and so solidify the material that should the enamel finish become cut or removed, no moisture can penetrate into the exposed surface.—CHAS. F. MOSS (The Leon J. Barrett Co.)

Handy Data on Chains

An interesting new catalog on all kinds of chain, both welded and weldless, is announced by the Columbus-McKinnon Chain Corp., Tonawanda, N. Y. Actually it's more than just a catalog, containing everyday data compiled in handy quick-reference form. Shows how to buy chain for greatest wear; precautions to employ in using chain to prevent undue strain and stress; what types of chain, hooks, shackles, etc., to use for different jobs; explains the "double-strength" of Herc-Alloy (Heat Treated Alloy) steel chain. A copy of this new catalog, called "Issue No. 7" will be sent free upon written request to the Columbus-McKinnon Chain Corp.

What's New « «

Rust Primer—Na-Taz

Na-Taz No. 70 rust primer, announced by the Pure Asphalt Co., 1750 N. Tripp Ave., Chicago, Ill., is available in clear, aluminum, black and colors. Its principal merits include:

1) Penetration down through the rust to the solid metal, and it tends to spread over the surface as much as ½-in. or more beyond where it is applied by brushing, spraying or dipping.

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4) Permanent flexibility due to its content of menhaden fish oil and rubber.

5) Moisture resistance due to its content of tung oil.

According to the manufacturer the problem of successfully preparing rusty surfaces to receive paint coatings has been positively solved by the use of Na-Taz No. 70 Rust Primer. This material may be applied directly over the rust, and it utilizes the rust as a pigment. Pigmented rust primer in colors is desirable for use over slightly rusted or new metal surfaces.

Synthetic Wax—Albacer

A high-melting, synthetic wax has recently been introduced by the Glyco Products Co., Inc., 949 Broadway, New York, N. Y. This wax has a melting point of 203° to 207°F., is hard, white and highly lustrous. It is non-toxic, free from odor and taste. Insoluble in water, it dissolves hot in hydrocarbon and chlorinated solvents, the best solvent being a mixture of one part of butanol, six parts of toluol and four parts of butyl acetate, which will hold in solution up to 5% albacer at room temperatures.

Albacer can be melted with synthetic resins, mineral and vegetable oils and other waxes producing products with many interesting properties.

It is absolutely free from paraffin wax, chlorine, phenol, sulfur and any harmful, corrosive or toxic substances. Albacer is recommended for polishes, cosmetics, paper and similar coatings, electrical insulation work, dental waxes, etc.

"Plicote"—Corrosive-Proof Protective Coating

According to The Watson-Standard Co. (paints, varnishes, enamels, dryers, lacquers), 225 Galveston Ave., Pittsburgh, Pa., "Plicote" is a new protective covering of paint-like nature for application to metal, concrete, stone, masonry, wood and plaster. It contains resin composed principally of rubber hydro-carbon derived from finest crepe rubber, which gives the coating some of the physical properties of rubber. However it is not to be confused with so-called "rubber paints."

"Plicote" is effectively resistant to acids, alkalis, brines, oils and greases. When dry, it offers an impervious film which does not permit fume or liquid penetration. It is resistant to heat deterioration and will stand up to 300°F. temperature. It will bake to a hard glossy finish that is easy to keep clean. Intense cold does not affect it . . . does not harden or thicken under low temperatures . . . is easily and quickly applied either by spraying, brushing or dipping; levels readily with entire absence of brush marks or orange peel; covers

Avoid an Awkward FINISH

A discerning eye will instantly spot an awkward finish in a golf swing . . . and that same eye is just as keen in spotting an awkward finish in your product. The outer raiment of a product can be just as clumsy . . . just as atrocious, as the swing of a golfing novice.

Often times a finish, though inappropriate, costs as much to apply as an appropriate one . . . the manufacturer in such cases is paying for an eye-appealing, sales-stimulating finish, but he isn't getting it.

If you are not getting all you are paying for in your finishes, let our creative studio work with you to improve your standard. This service has been helpful to many. There is no charge to reputable firms for a studio analysis of your finishing problems. Write for details.

Rockford Varnish Co.

ROCKFORD, ILLINOIS

500 to 600-sq.ft. to the gallon, depending on the surface. Two to four coats give very satisfactory protection . . . . is obtainable in black, gray, red, green, white, tan, brown, orange and aluminum.

Extreme hardness and density of film are the chief characteristics. Its hardness is equal to 90% of that of plate glass; and it is resistant to abrasion . . . . Good adhesion; does not crack, check, blister, chip or flake off.

Liquids Pour Freely From Improved Containers

A container for finishing materials from which liquids can be poured easily, freely and without coming in gulps or jumps when no hole is punched to admit air above the top surface of the encased liquid, has been invented by an experienced finishing foreman, Mr. Ludwig Lutter, 235 Royston Ave., San Antonio, Texas.

A view of a 5-gallon can with the patented top appears in service in Fig. 1, while cross-sectional views appear in Fig. 2. The real feature of this container top is the shallow arched channel extending diametrically across the top and having an opening to the inside of the can at each end—a round hole in line with the outside cap or spout, and a semi-

Fig. 1—Pouring liquid from can.

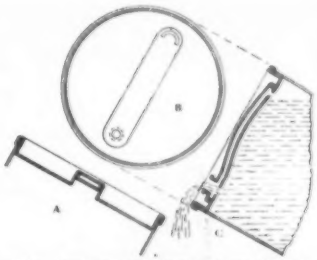

Fig. 2—Cross sectional views showing details of pressed metal top of 5-gallon container for finishing liquids.

A—Cross section of channel at highest point in middle of top.

B—Inside view of top of can where you see the insert piece (containing circular and semicircular holes near ends) pressed into the arched bulge which extends across top of the can.

C—Cross section of can top, lengthwise of the arched channel through which air is admitted into interior of can.

circular hole at the other end, see B, Fig. 2. The round hole is smaller than the spout opening in the top of the can, therefore when the can is tilted to pour out liquid, the stream is only as large in diameter as the inside hole. In passing through the larger spout opening there is room for air to get through the spout, into and through the arched channel, and into the can through the semicircular opening, where it fills space above the level of the liquid surface. Very simple when you understand it.

New Alcohol-Soluble Synthetic Resin

The Neville Co., of Neville Island Post Office, at Pittsburgh, Pa., announces a new alcohol-soluble synthetic resin called "Nevillac", the general properties of which are: Permanent thermoplasticity; solubility in alcohols, hydro-carbons, esters and other commercial solvents and diluents; freedom from wax, dirt, moisture and all foreign and insoluble matter. Used in lacquer formulas.

Physical properties: Melting point 203°F. and lower to meet varying requirements. Color range, one to eight. Acid value, five or less. Ash, under 0.1%.

Nevillac is soluble in all varieties of denatured solvent alcohol as well as in 95% ethyl alcohol, methyl alcohol, isopropyl alcohol, butyl alcohol, etc. Solutions of the resin in alcohols can be prepared either by heating together the resin and the alcohol under a reflux, or by thoroughly agitating the two together at room temperature in a rapid mechanical mixer or tumbling barrel.

In addition, the solubility of Nevillac in alcohols increases with the molecular weight of the alcohol. Thus Nevillac is more soluble in ethanol than it is in methanol, and more soluble in isopropanol than in either ethanol or methanol. Additional data about this new product can be obtained by writing The Neville Co.

Remote Valve Control

To supplement automatic control systems, the Foxboro Co., Foxboro, Mass., has developed the new remote hand control. In many processes, automatic controllers stabilize the operation to such an extent that many non-critical flows may be governed by hand valves, which need be readjusted very infrequently. However, if these hand valves are not easily accessible, it is only natural that even the few necessary adjustments will be neglected. Where these conditions exist, a Foxboro remote hand control, mounted on a centrally-located panel, enables the operator to adjust manually the degree of opening of an out-of-the-way, inaccessible valve without moving from his station. With it, he can reset a valve several hundred feet away to control temperature, pressure, flow or liquid level, using readings from his recording instruments to guide him in making the correct adjustments.

Simplicity and ruggedness mark both the design and construction of the remote valve control. Finished in lacquered cast bronze, trimmed with buff nickel, it is a fitting addition to any instrument panel.

Synthetic Baking Enamel for Handles

A note from Valentine & Co. declares that:

"Practically all the wood handle manufacturers, particularly those finishing handles and knobs for pots, pans and kitchen utensils, have been unsuccessful in obtaining a product which will not soften when immersed for any length of time in hot soap solutions which is equivalent, in the home, to repeatedly washing these utensils in boiling-hot soapy water.

"While this has been an almost insurmountable problem, Valentine & Co., 386 Fourth Avenue, New York, N. Y., has developed Industrial Valenite Baking Enamel, in black and colors, which now overcomes this objection. This synthetic baking product has unusual one-coat coverage and leaves a hard, mar-proof finish."

Waterproof Non-Drying Plastic-Putty

A new circular from The Graves Co., Box 1076, Hammond, Ind., lists the following merits and characteristics of an improved "Permanent Putty, Caulking Compound, Waterproofing and Airproofing Plastic."

According to the company's literature, Plastic Graco No. 10 is a perfect combination of liquified pure natural asphalt and asbestos—life-

time products of nature. This plastic putty is waterproof, adhesive, easy working, and it never dries out brittle, or cracks. It has been used for many years by industries requiring permanent protection against acids, fumes, weather, air infiltration, and general corrosion.

Characteristics include:

1) Smooth working; does not drag or stick to tools.

2) Does not sag when applied to vertical surface.

3) Contains no petroleum solvent; sets in a few hours; odorless.

4) Bonds to all damp or dry construction materials.

5) Never cracks, blisters, peels or "alligators."

6) Flexible, never oxidizes or dries to a brittle form.

7) Ready for use with gun, knife or trowel.

Care of Brushes

COLD, DRY winters are especially severe on finishers' brushes which are usually kept in buildings that are heated by steam, furnaces, or other dry heat. A brush should never be condemned because it contains a few loose hairs. The careful finisher will get these out before he puts his brush into service. A little care on the part of foremen will save a large amount of trouble and many a brush that is hastily condemned will prove to be a good one.

Swelling a new brush is a very important factor in its future usefulness. Under no circumstances should a new round or oval varnish brush be put in water with bristles down. Water-soaked bristles will always work flabby, and if the bristles are of a fine quality, they will nearly always twist. The handles are usually driven into round and oval brushes. Since both the wood and bristles shrink when the brushes are kept in a warm, dry place, it is advisable to swell these brushes before using them. *Be careful to put your brushes in the water with the handles down, letting the water come just to the point where the bristles emerge from the binding.* This will swell the handles without soaking the elasticity out of the bristles and making them flabby.

Keep brushes in a cool or damp place and as near the floor as possible. Exposure to heat will sometimes cause the wood to shrink and the best of brushes to shed their bristles.—C. F. SCRIBNER.

Joins Haynes Laboratories

Mr. R. V. Twombly, well known in the industrial field in New England, recently joined the sales staff of C. W. Haynes Laboratories Inc., of West Springfield, Mass. Mr. Twombly will make his headquarters at the company's Springfield office located at 44 Hampdon Street.

New Jones-Dabney Book

A handsome illustrated book containing 32 coated-paper pages 11x8½-in. bound between heavy embossed covers has been prepared for limited distribution by the Jones-Dabney Co., manufacturers of industrial finishes, Louisville, Ky., and Detroit, Mich. It illustrates and describes the company's activities in research and product development. The 2-color embossed front cover is a replica of the front elevation of the company's new laboratory.

SURFACERS

PORES NEED FILLING for smooth - textured attractive finishes. Presdwood, celotex, natural woods, rough metals and porous compositions need quick-drying, easy-sanding, high-bodied surfacers—in short, our CEL-U-LAK Surfacers.

These have unusually high body, coupled with low viscosity, permitting a heavy application by spray; air dry to sand in 1½ hours, force dry at 125° for 20 minutes. They are ground finely and have phenomenal adhesion and resistance to moisture.

CEL - U - LAK Surfacers are standard in white, ivory, dark grey and red. They have for 6 years been an outstanding successful item in our line. We suggest you examine it for your requirements.

The
VARNISH PRODUCTS CO.
CLEVELAND, OHIO

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Leolac

IS A TRADE NAME NOW ONLY FIVE YEARS OLD—yet it represents a complete line of Industrial and Automotive Lacquers backed by more than twelve years technical experience of L. S. Finch in the manufacture of lacquers.

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SAN FRANCISCO, CALIF.

French Polishing

by F. W. Purdon
Finishing Superintendent

Detailed information about the special materials, supplies and operations involved in this particular work are revealed by the author, whose article about "Expert Burning-in," in March I. F. was proclaimed by readers as "most interesting . . . in fact the finest article on the subject ever written in any magazine."

REFERRING back to my article on "Expert Burning-in," published in March, 1936, issue, I spoke of French Varnishing, or what is more commonly known among finishers as "frenching" or "padding-up." To know how to do this properly will save many a finisher from having a real heartache, especially at times when a certain piece of work is wanted immediately, and has been cut through in the rubbing operation, which would delay it, necessitating building up and recoating.

Possibly you may know that a real fine finish may be produced by the French polishing methods. In our factories which we formerly maintained in Paris, France and London, England, goods which were shipped from our factory here in the white K.D., were assembled and finished entirely by the French polishing method.

In this process mahogany, for example, is first given a coat of water to raise the grain; then, when the surface gets dry, it is sanded real smooth with fine finishing paper. The wood is then stained with water stain, this stain coat being applied with care in order to insure an even color on all parts. After the stain coat is thoroughly dry (12 hours) the surface is given a coat of raw linseed oil, allowed to set a few minutes, then wiped up, so as not to leave the surface wet. This coat of oil should be allowed to dry thoroughly for real fine work, 48 hours at the least.

The next operation is what is known as *rempli* or filling, but not what we finishers in this country know as filling. This operation rempli is done by first sprinkling fine pumice stone on the work, then with a *tompon*, or pouncer* as we know it (one which has been used) this pumice stone is worked into the pores of the wood by a circular movement of the *tompon*, which is kept damp to just the right degree with alcohol. As the

*Some finishers call it "bouncer."

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The Perfect 1-Hour Dry Enamel

Where speed, perfect adhesion, durability, protection or lasting beauty is desirable, use LARCOLOID.

Larcoloid air-dries, dust free, in 15 minutes—dries hard in 1 hour to a porcelain-like surface with acid, alkali, hot oil and salt spray resistance. Force-dry or bake if you wish.

Larcoloid is now being successfully used on practically all sorts of products and for maintenance protection on equipment and buildings.

Larcoloid has been the answer to all kinds of finishing problems. We will welcome the opportunity to tell you more about this sensational finish. Send us your inquiry.

Larkin Co Inc. PAINT DIV., Buffalo, N.Y.

Manufacturers of Primers, Enamels, Varnishes and Japans

Cut Your Rubbing, Polishing and Sanding Costs with

Paasche

AIRRUBBING AND AIRSANDING MACHINES

Spare your employees that fatiguing labor and secure finer finishes—with Paasche Airrubbing and Airsanding Machines. Easy to handle, well balanced, free from vibration, gives years of uninterrupted service without breakdowns or repairs. For pumice slush, felt or sandpaper. Used by leading industrial manufacturers everywhere.

Write for technical bulletin giving full details of savings possible with Paasche Airequipment.

Paasche Airbrush Co. 1917 DIVERSEY PARKWAY CHICAGO, ILL.

Pioneers of manual and automatic airfinishing, aircoating, airrubbing, portable airpainting units, ventilating units and spray booths.

Metallic

BRONZE FINISHES

Gold, Silver, Colored Effects in Bright, Soft, Vivid Tones.

ALUMINUM

All Grades Including

LINING POWDER

The Original

M-D-LUMINUS PASTE

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U. S. Products are backed by years of specialization and research in the manufacture of Bronze Powders of ALL TYPES.

Send us a description of the surface to be finished and you will receive a beautiful color chart of appropriate bronze finishes.

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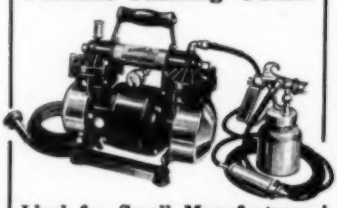
CROWN AIRFLO

Portable Painting Outfits



Ideal for Small Manufacturer

The new Airflo outfits (¼, ½ & ¾-hp.) have ample capacity to handle lacquers, synthetics and all modern finishes with speed and satisfaction.

Compressors operate without oiling —CLEAN air always—fewer moving parts — extremely portable. Greater painting power per motor horsepower guaranteed. Send for details.

Crown Spray Gun Mfg. Co.

1218 Venice Blvd., Los Angeles, Calif.

Warehouses in Principal Cities

pores begin to fill, a little shellac is added with the alcohol on the *tompon*.

I might say that among the really fine artisians at French polishing, you will find those who insist upon grinding their own pumice stone from a larger piece in order to insure that it has not been adulterated with ground oyster shells which, in time, will turn a yellow color if used. After the *rempli* or filling operation, the work is set aside to dry. When dried thoroughly (the more time the better for drying) you start to give it the build or body, which is produced with the *tompon* and shellac. The shellac is cut 160 to 200 grammes to one litre of alcohol. The 160 is used on mahogany, and the 200 on oak.

The first of the building or body coats is known as *chargie*, or the second filling. This is done with the *tompon* and shellac, and possibly a little pumice. This is done to correct any shrinkage which may have happened to the *rempli* or filling operation. The work is allowed to dry again. When dry, it is built up further with the *tompon* and shellac.

The "Tompon" or Pouncer

The *tompon* is made of knit wool rolled into a ball and placed inside a covering of washed linen. Linen will be free of lint if washed; this is important. The inside is saturated to a certain degree with shellac, then placed inside the covering, forming a ball about the size of a baseball or a trifle smaller. By twisting the covering tighter as you apply the shellac to the work, it squeezes the shellac onto the surface being finished. As this is done, you also have a bottle of alcohol with a

WATEROIL STAINS

have won National Approval

They are fast to light, quick drying, non-bleeding and non-grain-raising. Made from water colors.

. . . *also!*

REAL-FILL FILLERS

There are none better. No shrinkage or lifting from pores. Clear colors.

LICENSED OR UN-LICENSED LACQUERS

A trial will disclose their exceptional merit.

LIGHT-FAST SHADING STAINS

Prevent fading and blend perfectly.

No. 1900 CLEANUP POLISH

Eliminates haze or bloom. Miscible in water.

"Unquestionable Quality"—Wood Finishing Supplies

V. J. DOLAN & COMPANY, INC.

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SILK SCREEN METHODS of REPRODUCTION

Fully Illustrated by the Author. Leatherette Binding. Size 5x7½ in. 193 Pages. 98 Illus...... **$3.00**

THIS new book is intended for Sign Painters, Card Writers, Display Men, Furniture Manufacturers, Novelty Manufacturers, Glass Etchers and For Domestic Use.

Every detail of the silk screen process is presented clearly in detail. All equipment is fully described and its use illustrated. All materials needed in the various kinds of silk screen work are mentioned with respect to their use to advantage. Estimates of costs and prices to charge are given.

Practical Publications, Inc.

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THEY KNOW QUALITY!

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CLAREMONT, N. H.

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TAKE IT EASY!

Save time, energy and money by using these highly flexible, quick-sticking masking tapes. They leave keen, clean edges for exact color separation in every weather.

PERMACEL

The perfected paper masking tape. Noted for ease and accuracy in handling.

JONFLEX — A fine-woven, flexible cloth masking tape.

INDUSTRIAL — Dependable Revolite quality in a heavier, coarse-woven cloth masking tape.

Send for sample rolls

Sizes: ¾ in. to 36 in. wide in 60-yd. rolls

THE REVOLITE CORP.

A Subsidiary of Johnson & Johnson

NEW BRUNSWICK NEW JERSEY

goose quill run through the cork. This makes it easy to shake the alcohol onto the face of the *tompon* as the shellac is applied by circular motions. The shellac must not be allowed to build up on the work in streaks or heavy ridges. If this does start, more alcohol must be added to the *tompon*.

This operation is repeated several times, allowing the surface to dry thoroughly between operations, or what might be called coats. On each successive coat, the amount of shellac is reduced on the *tompon*, and more alcohol is added until the final operation is being done with straight alcohol, which produces a hard brilliant finish.

At times during the building up of the finish, a little raw linseed oil may be added to the face of the *tompon* to stop what is known as "burning."

The final French polished job should not show any real depth in body, but should be very brilliant and have a surface like plate glass—a really beautiful finish to see.

In our office today we have the first prize medal which our exhibits were awarded at the Paris Exposition in 1900.

This finish may be produced on a piece of work in one day, one week, or six weeks, depending upon the quality of work desired. The really fine work requires from six to eight weeks to produce. Most of this time is required for proper drying.

Wonderful for Fine Repair Jobs

As I stated at the beginning of this article, to know how to produce a French polished finish would save a finisher many heart-

aches—when he has a piece of work that is cut through slightly. It is very easy to French this portion by using a small *tompon* or pouncer made of washed cheesecloth with ordinary cotton for a center. Saturate it with shellac (not too much), work it into the pouncer by padding it upon a clean piece of wood or glass; then go over the place cut through with a back and forward motion, adding a few drops of linseed oil if it starts to stick. As the shellac begins to build up, start to use a little alcohol, and when the shellac has built up to the body required, use alcohol alone, being sure to work the edges down fine. After the operation is finished, if it is too bright, it may be dulled down by a little light rubbing with pumice stone and oil.

This French polishing or padding is used to a great extent in piano finishing to repair places cut through during the coarse rubbing, and many times after the fine rubbing or rottenstoning has been done, especially along edges and on sharp corners.

It is very useful to the repair man in the store or warehouse. Many shipping or transit grievances may be remedied by a man who is skillful with a burning-in knife and a French polishing pad.

A Word to the Beginner

I don't wish to deceive the novice. I want to make it clear now: Don't expect to be able to finish a piece of work or repair a cut-through place the first time you try, because you will be thoroughly disappointed. It is an art, and it takes a good many years of experience to learn to produce a fine French polished finish, and

NEW

UNUSUALLY ATTRACTIVE

shades of Mahogany and Walnut have been developed in our laboratory. These colors are obtained by using Acid Stain Powders . . .

No. 53-793 Mahogany

No. 53-723 Walnut

Several leading furniture manufacturers will show suites finished with these new colors at the next Chicago and New York furniture markets.

Samples and specification folder sent upon request.

SPRUANCE QUALITY

Specialists in manufacture of wood finishing materials, varnishes, lacquers and enamels.

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New and Greater Protection!

The MSA Comfo Paint Respirator

Twin Cartridge Type

Here's the utmost in paint-spraying protection, plus real working comfort. Extremely light, well-balanced, easy to adjust. Fits any face perfectly, permits full vision. The great filter area materially reduces breathing resistance, increases filter efficiency and life of cartridges. The Twin - Cartridge Comfo *costs less to maintain!* Write for Bulletin EM-2. Demonstrations arranged on request.

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SURE AS SHOOTING

Balanced like a good gun! That's why it almost points itself and on an all-day grind does a better job with less effort in less time.

Rifle-like precision assures accuracy and freedom from varying adjustments. Every part touched by the paint is in the single unit spray head. Sprays all types of material.

Write for new "Type MM" catalog.

The ALEXANDER
MILBURN
COMPANY
1402 W. Baltimore St., Baltimore, Md.

quite some time to learn to do just a small patch or repair job. But once mastered, you have something which will save you a lot of work and time in repairing. To get results with a French pad or *tompon* is like getting a proper observation with a sextant; you must be educated or taught how to use it properly. This may be done with practice. Practice is experience and experience is the finest of all teachers, and I am sure if you learn this little wrinkle, you will be repaid many, many times.

Tung Oil from China

More than 86% of the millions of pounds of tung oil exported monthly from Hankow, China, comes to the U. S. The remainder goes to European countries, chiefly Germany and the United Kingdom. According to last reports the monthly tonnage of tung oil exports from Hankow has been decreasing since December, 1935, when exports reached more than 10,000 tons. The price of this raw material is advancing. In March the price per picul of 133 1/3-lbs. reached 72 Chinese dollars (about $21.60 in U. S. money).

Letters from Readers of "Industrial Finishing"

Editor's Note — These letters have been promptly answered and all of the inquiries have been referred to advertisers in the magazine. They are published here to indicate or suggest certain interesting trends of thought and activity in the industry, and to encourage further inquiries, comments and suggestions. The names and addresses of firms or individuals whose letters are published here may be had by writing to this office, or letters addressed to them in care of this office will be forwarded immediately.

Sea Moss

We have been trying to find a company that sells sea moss, or at least that is the material we think we want. Several years ago we bought a bale of the material but cannot now locate the seller. We want the material for use in the finishing room of our cabinet shop, for wiping off stain particularly.—D. Q. & Son (Showcases, Store Fixtures).

EDITOR'S NOTE: You might also inquire about "Fillerub," supplied by Oscar Smith & Sons Co., Philadelphia, Pa.

Silk Screen Book

It is rather late to ask for one of your articles published in INDUSTRIAL FINISHING, but it does show that we think enough of your magazine to keep it. We are especially interested in "Screen Process Painting," and would greatly appreciate getting the book mentioned in the paragraph on this subject on page five of your April, 1934, issue. (24 months back). The only identification as to who issues the book is that the X. Y. Z. Co. is mentioned at the end of the article.—L. & B. Co. (Musical Instruments).

EDITOR'S NOTE: The booklet is distributed free by Ault & Wiborg Corp., whose advertisement appears in this magazine. It contains 24 pages 4x7½-in. INDUSTRIAL FINISHING also offers a "Silk Screen Methods" book of 160 pages 5x7½-in., 87 illustrations, leatherette binding, price $3.00.

Showcase Finishing

The article by W. R. Cockerham in April issue (see page 13) was very interesting. You ought to put more of these stories in your book each month so as to enlighten some of the old fashioned finishers.

It is all right for some of the wood finishing consultants to give suggestions and information on how to finish with a standard color, but what about the problems in the finishing room of a big office fixture and store fixture plant, where the foreman has to match a new sample on every job?

Here you are allowed one or two weeks to get out a job. You send for the finishing material salesman and tell him what you want. He tells you how wonderful the new water oil stains are. Perhaps it takes his company five or six days to match your sample. Then you have a problem with it. It matches perfectly with one of the pieces of wood the salesman took with him, but you know that when the average job gets to the finishing room there are variations in the color and texture of wood of the same species, for example, walnut. You find dark heartwood, light sapwood and various intermediate tones. These variations in color must be equalized, and still the wood must show richly beautiful under the top coat of transparent finish. And I am not saying much about quartered hard oak. Try and get it to take stain on the flakes—and when you get four or five different kinds (colors) of it, you sure get a

NU-TIPE

Wiping Stains

are Worth Investigating!

Write for samples of these wiping stains that provide far greater uniformity than all other oil stains. Their use greatly reduces the need for shading.

For trimmings on table legs and case goods and other surfaces, NU-TIPE Wiping Stains provide light uniform colors as color-fast as water stains. Made for brushing, dipping, spraying.

THE LAWRENCE-McFADDEN CO.

1400 FRANKFORD AVENUE

PHILADELPHIA, PENNA.

headache. It might be all right for standard colors, but when you match to a sample in the store fixture game, I have found that it is best to make your own stains, for we can not wait for the factory to make up special stains. Of course, I am open to suggestions. I would like to hear from others familiar with the custom jobs encountered in the bank, office and store fixture business.—Andrew Camis, Foreman Finisher of Showcase Factory.

Colored Oil Solutions

In your April 1936 issue of INDUSTRIAL FINISHING there is an article under the heading of "Modern Wood Finish" by W. R. Cockerham, Wood Finishing Consultant of the Maas & Waldstein Co. This article is very interesting to us, especially that part which deals with colored oil solutions, and we would like to get more information as to a walnut oil solution. Could you give us Mr. Cockerham's address so that we could write him, to find out where he secures the oil solutions?—N. R. Mfg. Co. (Interior Cabinet Woodwork).

EDITOR'S NOTE: The Maas & Waldstein Co., 430 Riverside Ave., Newark, N. J., can supply the material, see their advertisement in this magazine.

Solvent Purifier

In your February issue of this year, page 40, there is some descriptive matter and a picture of a Bowser Solvent Purifier. Will you please give me the address of this firm, as we are interested in obtaining some information relative to this solvent purifier?—B. Paint & Varnish Co.

We are interested in the Bowser Solvent Purifier described in your February issue. Will you kindly let us have full details and price of this machine C. I. F. London docks?—Lissen Limited, Angel Road, Edmonton, London, N. 18, ENGLAND.

EDITOR'S NOTE: It's S. F. Bowser & Co., Ft. Wayne, Ind.

Dip Finishing

The March issue of your publication came to the attention of the writer in his search for information on the smooth application by dipping of varnish to a vertical surface. Several of the articles were quite interesting to the writer and it occurred

to us that from time to time you may have had articles on this subject. If you can refer us to a source of information (a book, manufacturer or expert) on what makes a film of varnish on a vertical surface smooth and level, or wavy, it would be very much appreciated.—P. R. Co. (Fine Fishing Tackle).

Rubber Finish on Metal

I was especially interested in one of the letters from your readers mentioned in the March issue of INDUSTRIAL FINISHING, as I too am wondering if there is a product for dipping or coating a rubber finish on metal.—W. J. E.

Plasticon?

We have a request from England for a material known as "Plasticon," which they report as "an American adhesive used for sticking fabric to polished aluminum." We shall be glad if you will advise us if you have any record of this material, and if not whether any of your readers know it.—T. E. L. (Standard Airplane Finishes).

EDITOR'S NOTE: This might be "Plaskon" which is a product of Toledo Synthetic Products Co., Toledo, Ohio. An inquiry for a cement to stick felt to aluminum, published in the "Letters" two years ago, brought replies from no less than five concerns offering to supply a satisfactory material for the purpose. Names of these companies will be furnished on request.

Rub-It-On Varnish

We noticed in a recent INDUSTRIAL FINISHING, J. A. E.'s inquiry for Rub-It-On varnish for linoleum. We would be very glad to write to J. A. E. and give him full particulars, if you will kindly furnish us with his name and address.—Thompson & Co. (Industrial & Technical Paints).

Wrinkle Finishes

We have the March copy of INDUSTRIAL FINISHING which is very interesting. We note an article on page 14 written by C. L. Nagel, "Shrivel or Wrinkle Finish" (And Crystallizing Finish, Too). We are very much interested in these various finishes and we ask that you

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please advise the name of the companies that furnish the material for the wrinkle, shrivel, and crystallizing finishes. It will be agreeable to us if you will send a copy of this letter to the concerns that manufacture this enamel and ask them to send us small samples of various colors.—S. H. Co. (Automatic Water Heaters).

We would like to know more about shrivel or wrinkle finish, as described in your March issue. Would appreciate if you could put us in touch with the manufacturers of this product.—B. A. & J. Co. (Tanks, Water Heaters, etc.).

"Chek-Rust"

In the January 1935 issue of INDUSTRIAL FINISHING (15 months back) on page 26, you carry a paragraph dealing with "Chek-Rust." Will you kindly send us the name of the manufacturer of this product, as we feel that it might be of use to us.—J. D. Co. (Drapery Hardware).

EDITOR'S NOTE: It's Smith-Alsop Paint & Varnish Co., Terre Haute, Ind.

Respirator

Will you please advise me the name of the manufacturer of the Dupor Respirator illustrated on page 44 of the February 1936 issue of INDUSTRIAL FINISHING magazine?—H. A. K. (Automobile Painting).

EDITOR'S NOTE: It's H. S. Cover, 1933 Chippewa Ave., So. Bend, Ind.

Paint Mixers

On page 32 of February issue is a brief description of a mixing machine for stirring up the contents of paint cans. Could you supply us with the name of the manufacturer of this equipment?—J. Dental Mfg. Co.

On page 51 of your December 1935 issue there is an advertisement for an Electric Paint Mixer for use in conjunction with 5-gallon containers. As we are also interested in this, if you know of anything on the above lines, we should like to receive full particulars.—W. Lusty & Sons Ltd., Bromley-By-Bow, London, E 3, ENGLAND.

EDITOR'S NOTE: These companies have been advised of several concerns that can supply paint mixers.

Light Wood Finishes

In your January 1936 number, on page 28, in the paragraph headed "Super Wood Bleach," you mention Pickle Mahogany and Pickle Maple. We are interested in obtaining more information on this new finish and would appreciate a reply as to the address of the manufacturer making these bleaching solutions.—D. U. Co.

EDITOR'S NOTE: This particular item is a product of Grand Rapids Wood Finishing Co., Grand Rapids, Mich. Also, "Blanchit," for bleaching, is furnished by L. R. Van Allen & Co., Chicago, Ill.

Dot-Making Tool

We would appreciate your advising us if you can furnish us with a fountain pen, or brush that will contain a supply of colored lacquer, same to be used for making a dot of various colors on metal or Bakelite. The size of the dot to be made will be approximately 3/32 to ⅛-in. in diameter.—T. T. Co. (Specialties).

"Metal-Prep"

I wonder if you can tell me who makes Metal-Prep, a cleaner?—H. & C. Mfg. Co.

EDITOR'S NOTE: It's a product of Neilson Chemical Co., 6564 Benson St., Detroit, Mich.

Wood Graining

In looking through your magazine INDUSTRIAL FINISHING we have seen many useful suggestions; also questions asked and answered. We would like to find a process of wood graining the insides of passenger buses to make an oak or mahogany finish, this graining to be done on metal panels.

If you know of anyone who has a stencil process or something of that sort that is useful in this type of work, we would appreciate your giving us this information at once so we may write them and get full particulars—H. Truck & Coach Co.

We are trying to locate some information on the process of graining wood with offset printing or similar procedure. We think it is done by putting the grain on the printer's roller material and printing there-

(Continued on page 78)

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EDITORIAL

Salvaging Finished-Damaged Dip-Coated Articles

A concern that dip-finishes thousands of small wooden articles daily has developed an economical and satisfactory system of cleaning and recoating the small percentage of rejects which, for some one of several reasons, are not perfectly finished in the one coat of machine-dipped enamel — and the finishing materials are also salvaged.

The rejects are placed in a closed tank of solvent which is thoroughly agitated to quickly remove the fresh color enamel. The solvent removes the heavy enamel coating, although it leaves the wood parts color stained, but this does no harm. Then the cleaned parts are allowed to dry and are redipped.

When the cleaning solvent becomes loaded with color, it is withdrawn from the tanks and poured into containers where it is mildly filtered to clean it of any specks and foreign matter, after which the colored solvent is drawn off and used again as thinner for new batches of dipping enamel. Care is observed, of course, to properly proportion the mixtures, so that a uniform specific gravity and viscosity are always assured, regardless of whether the enamels are thinned with new (clear) or used (colored) solvents.

Finishes Not Foolproof

You can get finishes that are acid, alkali and alcohol proof, heatproof, waterproof, etc., but none that are foolproof. None are proof against abuse or misuse by workmen. The carelessness, negligence or ignorance of workmen in using cleaning and finishing materials, equipment and methods results in a tremendous amount of preventable waste in industry.

If you are going to try a different finishing material or piece of equipment, be fair enough to see that the manufacturers' directions are carefully observed, and that all shop conditions are made favorable to its success. The workman or foreman can make it fail, either knowingly or unknowingly; and if he does, two concerns (your company and the supplier of the

goods) must stand the disappointment and expense of a failure.

Reputable manufacturers of finishing materials, supplies and equipment spend a great deal of time, effort and money in developing and improving their products, and they go to still more expense in introducing their products to the trade. They are not putting all this money back of failures. The goods they offer deserve a fair trial.

Impregnation of Wood Solves Certain Problems

Wood finishing, ordinarily, is thought of as a process that includes the application of uniforming stains (or bleaching compounds) filling if necessary, sealing, and the uniform spreading on of one or more film-building coatings by means of which the actual wood surface is protected from physical contact with anything. However, there are many wooden articles and parts on which a built-up film is undesirable; for example, woodenware which in service comes into direct contact with food products. Obviously the surfaces of these wooden articles need some kind of treatment to resist the wear and tear of service and perhaps to improve their appearance.

The answer to this problem, in many cases, lies in impregnating the surface of the wood with some neutral or harmless oil, wax, resin or other material that can be forced deeply into the pores of the wood while perhaps heated and in a thin liquid state. Considerable research work has been done along this line and some interesting materials, equipment and processes have been developed for practical application of the idea. Among other things, this impregnation of the surfaces of wood with suitable materials makes the wood waterproof and more or less resistant to damage by mild cutting or scratching with sharp tools.

Style Colors in Products Predetermined in England

In England all industry, in which color is a style factor, conforms to a color code, according to Howard Ketcham, Director of Duco Color Advisory Service. The recently organized British Colour Council sees to it that color fashion cycles are controlled as far as possible. Colors are determined in advance of each year by representatives of all British fashion industries. This enables manufacturers and distributors to prepare offerings effectually well in advance of each season.

In the clothing industry, for example, shoe, handbag, hosiery,

hat, coat and suit colors are properly coordinated by their respective suppliers so that the market will afford the proper color relationship to induce ready sale without the needless waste unorganized color speculations have represented in the past.

The work of this council promises much of value in reducing the risks of buying and holding stocks to a minimum.

Two hundred and twenty colors have been deemed sufficient for this purpose. The adoption of standard names and numbers for these is intended to eliminate much confusion. In the past one color has been offered under a variety of names or else countless variations of the same color are offered in conjunction with a single color name.

Is Your Fire Fighting Equipment Strictly OK?

One reason for keeping the plant clean and having fire fighting and fire emergency equipment available is to meet the requirements of fire inspectors. A better reason is to really protect the plant against all possibility of a disastrous fire. Fires usually start at unexpected and inopportune times. Carelessness, neglect or ignorance on the part of one or more workmen or the foreman may permit the fire to start, and once started it will gain rapid headway in a finishing department unless prompt and efficient action is taken.

Make sure that:

1) All rules for fire protection are observed.

2) All fire extinguishers and other fire fighting apparatus are of an approved type and in good working order.

3) The location of hand extinguishers is properly marked and easily accessible.

4) Every workman, including the watchman, understands how to use hand fire extinguishers, and what to do in an emergency.

Automatic fire extinguishing equipment is important and desirable, but do not rely upon it entirely. Supplement it with suitable hand equipment, and see that every man in the shop knows where it is and how to use it.

Reflection Values of Different Colors

The percentage of light and heat that is reflected from surfaces painted in different colors often becomes a matter of considerable importance in the selection of colors for exterior roofs, walls and equipment, as well as for interior ceilings, walls and furnishings. In this connection accompanying figures, based on data compiled by the Lighting Research Laboratory of the General Electric Co. are of interest.

Color of Paint	Reflection Factor %
White (gloss)	84
White (flat)	82
White (eggshell)	81
Ivory white	79
Cream	74
Aluminum	73
Ivory tan	67
Light green	62
Light gray	59
Buff	55
Light blue	52
Medium green	49
Tan	48
Medium blue	43
French gray	32

Cleaning Metal to Be Finished

TO OBTAIN the high quality finishes demanded today in all branches of the metal industry, it is necessary first that the metal surfaces be thoroughly cleaned.

Regardless of whether the succeeding operation is to be lacquering, enameling, protective base coating, or plating, a clean surface is essential for perfect adherence and service life. A trouble-proof coating is obtained only when all traces of foreign matter, such as oil, dirt, oxide, and gas film are removed.

For maximum efficiency, the cleaning operation should be perfectly geared with the company's particular requirements and production procedure. Generally it must be performed quickly, at low cost for labor and materials—with safety to workmen, product and equipment — and with complete removal of foreign materials. In many cases, the important operating economies that can be obtained through proper attention to these factors are overlooked.

Success in the solution of cleaning problems usually depends upon: 1) Proper analysis of all conditions; 2) a background of technical research combined with broad practical experience; and 3) the development of specially compounded chemical cleaners and suitable equipment for applying these cleaners economically.

Recommendations for the sequence of cleaning operations and the type of cleaner to be employed should be made only after proper investigation of the finishing requirements of the particular product and the inherent characteristics of the metal from which it is fabricated. The benefit of the latest developments in cleaning technique and uniform results with quick thorough cleaning are available to concerns that have much metal cleaning to do.

In wet cleaning, there should be provided the penetration, wetting action, emulsification and free rinsing qualities so essential to efficiency. But effective cleaning must be accomplished with safety to operatives and to the metal surfaces being cleaned. For example, pitting of the metal must be prevented, and there must be no remaining residue that might interfere in any way with the drying and finishing to follow.

In analyzing a cleaning problem, experienced cleaning engineers first find out what makes the cleaning operation necessary. In many cases, simply by suggesting minor changes, the cost of the cleaning operation may be reduced. Sometimes a pre-wash tank will remove much of the oil and dirt, thereby protecting the final cleaning tank.—Detroit Rex Products Co.

Egyptian Lacquer Mfg. Co. to Rockefeller Center

The Egyptian Lacquer Mfg. Co., for many years located at 90 West St., New York, N. Y., announce the removal of their offices to Rockefeller Center. They are now located on the 29th floor of the R. K. O. Building (1270 Sixth Ave.) directly adjacent to the Radio City Music Hall, appropriately called "The Show Place of a Nation." According to the announcement sent to the trade, their new offices are modern in every respect, centrally located and easily accessible. We congratulate Egyptian on this move and join their many friends in wishing them well in their new quarters.

To Identify Pipe Lines

Pipe-line identification with the use of color is quite general. Several years ago there was a veritable craze for this, and many plants ran wild in carrying out an intricate system of color identification. Since then, it has become much more simple, with even more satisfactory results. Of course, each plant has its own problems in this respect, so it is somewhat difficult to lay down any set rules. However, the following constitutes a reasonably satisfactory guide:

Red	Fire Control Equipment
Yellow	Dangerous Material
Green	Safe Products
Blue	Protective Material
Purple	Extra Valuable Material

The scheme most generally followed today is to finish the body of the pipe lines the same color as the adjacent surface, and to identify the line by finishing valves, couplings, and so on, with the designated color.

One large plant, with a multiplicity of pipe lines, also employs a coding system on the line itself. It looks somewhat like what is shown in the accompanying illustration. Arrow indicates the direction of flow and the initials "C.W." mean "city water." These symbols are placed on the pipe, where they may be seen most easily from the floor level. The plant engineer can readily work out a scheme, using the colors just named for guidance. — THE DU PONT MAGAZINE.

Initials identify the contents and an arrow indicates the direction of flow.

More Paint and Varnish Exported

Export shipments of American paints, pigments and varnishes during 1935 reached a grand total of $16,345,000. In the preceding year export shipments of such products were valued at $14,214,000, and in 1933, the value was $11,834,000. Shipments of ready-mixed paints, varnishes and lacquers have almost doubled both in quantity and value during the past three years.

Letters from I. F. Readers

(Continued from page 73)

from. If such rollers are now manufactured, would you kindly give us the name of the firm from whom we can buy them? If you have any literature regarding the process of preparing these rollers, we would like to obtain same.—S. R. Co. (Artistic Wood Products).

EDITOR'S NOTE: Three or four concerns manufacture equipment for reproducing wood and marble graining on panels or surfaces of metal, composition material, plywood, etc., and others manufacture graining paper to be pasted on such panels. One of them has promised to prepare an article on the subject for publication in INDUSTRIAL FINISHING.

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Pre-Heated Finishes

We have received the following inquiry from our distributors in Johannesburg, S. A.:

"We have been asked to supply information on the following:

"Pre-Heat Finishes, for furniture and woodwork. We have been informed that the above practice is being carried out in America and Europe.

"From the information that has been given to us, we understand that there is a special spray gun, which has an electrical device that heats the lacquer on its way through the nozzle.

"We shall be pleased to receive all information you may have on this subject."

We would deeply appreciate any information you can furnish us.—W. & C. Co. (Finishing Materials).

Painting Barrels

On page 66 of April INDUSTRIAL FINISHING, we notice a picture showing a new machine to paint barrels and drums. Would you be good enough to let us know the name of the company making this machine?—Chemical Industries.

EDITOR'S NOTE: It's Reynolds Metals Co., 19 Rector St., New York, N. Y.

Drum Spinner-Agitator

Will you kindly send us the name of the manufacturer of the drum spinner-agitator, a machine for rotating drums or barrels, as shown on page 34 of February INDUSTRIAL FINISHING?—E. C. S. Co. (Spray Equipment).

EDITOR'S NOTE: It's the Vol-U-Meter Co., 710 Ohio St., Buffalo, N. Y.

Striping Tools

In the April issue of INDUSTRIAL FINISHING, on page 53, we notice a letter from one of your readers requesting additional information on striping tools. We are interested in the same information. Please give us the names of the manufacturers . . . . —G. K. E. (Lighting Specialties).

Reclaim Wiping Rags

We read an article in the February issue of INDUSTRIAL FINISHING concerning the reclaiming of used wiping rags. Will you kindly advise us the names of manufacturers making equipment for that purpose?—M. B. Co. (Fine Burial Caskets & Supplies).

EDITOR'S NOTE: The company's name is under the illustration accompanying the article, see page 11. It is Rochester Engineering & Centrifugal Corp. (Division of The American Laundry Machinery Co.), 110 Buffalo Road, Rochester, N. Y.

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